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UNDESCRIBED SPECIES OF NEARCTIC TIPULIDAE (DIPTERA) VII

Charles P. Alexander[1]

The new species described herewith are from California, Idaho, and the Canadian North West territories, as discussed under the individual descriptions. The types are preserved in my personal collection of these flies.

Tipula (*Pterelachisus*) *horningi*, n.sp.

Size small (wing about 9 mm.); general coloration of thorax brownish yellow, conspicuously patterned with dark brown, including a narrow median vitta on scutum and scutellum; wings grayish white, the outer radial field slightly darker; abdomen obscure yellow, both the tergites and sternites with a continuous brownish-black central stripe, lateral tergal borders with interrupted similar darkenings; male hypopygium with apex of each tergal lobe produced into a slender blackened spine; ninth sternite with an arcuated blackened lobe; inner dististyle with beak slender, outer basal lobe an arcuated horn that narrows into an acute spine.

Male.—Length about 10 mm.; wing 9 mm.; antenna about 3 mm.

Female.—Length about 10-11 mm.; wing 8.5-9 mm.

Described from alcoholic materials. Frontal prolongation of head light brown, nasus elongate; palpi light brown, long, from about two-thirds to three-fourths the antennae. Antennae with three proximal segments light brown, remainder black; flagellar segments only feebly incised, longer than the verticils; terminal segment very small, short-oval. Head above dark-brownish gray, paler brown beneath.

Pronotum yellowish brown, scutum narrowly dark brown medially. Mesonotal praescutum brownish yellow with three blackened stripes, the median one broad in front, narrowed behind, vaguely divided on posterior part, not reaching the suture; lateral stripes virtually continuous across suture with a major blackening on scutal lobe; a narrow continuous black central stripe on scutum and scutellum, mediotergite dark brown. Pleura chiefly pale, with major

1. Amherst, Massachusetts

darkened areas on anepisternum and sternopleurite. Halteres pale, knob infuscated. Legs with coxae yellow, their bases narrowly and vaguely darkened; trochanters yellow; femora and tibiae yellow, tips narrowly dark brown; tarsi brownish black, claws simple. Wings grayish white, clearer in the obliterative areas at cord; centers of cells of outer radial field slightly more darkened; stigma light brown; veins dark brown. Macrotrichia of veins relatively sparse, the extreme condition including outer end of R_{4+5}, all outer medial veins, and tips of Cu_1 and *2nd A*, in some specimens the outer veins virtually glabrous.

Abdominal tergites in male obscure yellow with a narrow continuous brownish black central stripe, the lateral lines interrupted at base and apex of each segment to produce elongate dashes; sternites yellow, with a broad entire black central stripe; in the females the darkened pattern narrower and paler. Male hypopygium with posterior border of tergite having a deep V-shaped notch, the sides of the emargination darkened and thickened, apex of each lobe produced into a slender blackened spine. Ninth sternite with a small arcuated blackened lobe, the free outer half with numerous short yellow setae. Apex of basistyle produced into a slender arm, tip obtuse, sides with long black setae. Outer dististyle long-oval, with conspicuous setae; inner style with beak slender, lower beak lacking; region of outer basal lobe produced into a hornlike structure, curved and narrowed to an acute spine, outer surface with long yellow setae; sensory area extended into a linear series comprised of six elements placed at base of outer basal lobe. Phallosome with central plate depressed, on either side at near midlength with a small slender recurved spine, with a smaller median spine more distally.

Habitat.—Idaho (Butte County).

Holotype, ♂, Craters of the Moon National Monument, June 30, 1965 (D. S. Horning). Allotopotype, ♀, with the holotype. Paratopotypes 4 ♀♀, with the types, July 3-17, 1965.

I am pleased to dedicate this species to Mr. Donald S. Horning, Jr., who has conducted a study of the fauna and flora of the Craters of the Moon National Monument. The most similar species include *Tipula* (*Pterelachisus*) *imbellis* Alexander and *T.* (*P.*) *mandan* Alexander, which differ conspicuously in all details of hypopygial structure. All three species have the basistyle produced and with the outer basal lobe of the inner dististyle variously modified.

Tipula (*Lunatipula*) *mecotrichia*, n.sp.

Belongs to the *albofascia* group, allied to *cladacantha*; general coloration of mesonotum yellowish gray, praescutum with four reddish-brown stripes; male hypopygium with each tergal lobe produced caudad into a slender blackened point; inner dististyle with beak very short, base of dorsal crest with very long setae, outer basal lobe bilobed, each lobe again divided, the posterior one into spines; eighth sternite with each lobe densely provided with long delicate setae and with three enlarged spinoid bristles.

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Male.—Length about 13-13.5 mm.; wing 15.5-16.5 mm.; antenna about 5-5.3 mm.

Female.—Length about 14 mm.; wing 16 mm.

Frontal prolongation of head about equal in length to the remainder, obscure yellow, narrowly darker above, without a nasus; palpi black. Antennae with scape and pedicel yellow, flagellum black; flagellar segments slightly exceeding their verticils, basal enlargements small. Head light gray, more yellowed at occiput, vertex with a capillary dark brown median stripe; setae of vertex short.

Pronotum brownish yellow, narrowly darkened medially. Mesonotal praescutum with the ground yellowish gray, clearer gray laterally, disk with four reddish-brown stripes, the intermediate pair with the broad interspace more yellowed; scutum gray, each lobe with two reddish-brown areas; scutellum and postnotum brownish-yellow, heavily gray pruinose, especially the latter. Pleura brownish gray, dorsopleural region yellowed. Halteres with stem yellowed, orange at base, knob blackened, apex pale. Legs with coxae obscure yellow; trochanters yellow; femora and tibiae obscure yellow, tips narrowly darkened; tarsi light brown basally, passing into brownish black; claws with a stout triangular tooth. Wings brownish-yellow, prearcular and costal regions clearer yellow; stigma small, medium brown; obliterative band at cord extending into base of cell M_3; veins brown, yellowed in the brightened fields. Venation: petiole of cell M_1 variable, from subequal to about twice *m; m-cu* on M_4 just beyond base.

Abdomen brownish yellow, tergites with three narrow brown stripes, the lateral and posterior borders of segments narrowly gray; sternites reddish brown; hypopygium large, subglobular, castaneous. Ovipositor with cerci relatively short, tips slightly decurved, hypovalvae broad. Male hypopygium with each tergal lobe extended caudad into a slender blackened point, the margin microscopically roughened. Lobe of ninth sternite simple, with relatively short setae. Inner dististyle with beak very short, lower beak oval; setae at base of the long compressed dorsal crest very long and conspicuous; outer basal lobe bilobed, each lobe again divided, the anterior one with the points triangular, the posterior lobe extended into two divaricate slender spines. Eighth sternite with conspicuous semidetached lateral lobes, each with three major fasciculate setae, the outer margin fringed with abundant smaller yellow setae.

Habitat.—California (Fresno County).

Holotype, ♂, Kings Canyon, along Route 180, at 10-mile Creek, 3,900 feet, June 1, 1963 (C. P. Alexander). Allotopotype, ♀, May 31, 1963. Paratopotypes, 4 ♂♂, with types, May 31-June 1, 1963; occurred in dense thickets near the bridge.

Tipula (*Lunatipula*) *mecotrichia* is most closely related to *T.* (*L.*) *cladacantha* Alexander and *T.* (*L.*) *cladacanthodes* Alexander, differing conspicuously in the male hypopygium, particularly the ninth tergite, ninth sternite, inner dististyle, with its outer basal lobe, and the eighth sternite.

Dicranota (Dicranota) bernardinensis, n.sp.

General coloration gray, the praescutum with three stripes, the broad central one blackened; knobs of halteres infuscated; wings whitened, the long-oval stigma brown, *Sc* long, Sc_1 ending about opposite the supernumerary crossvein in cell R_1; male hypopygium with lateral tergal arms distinctive, appearing as a flattened blade that splits into two long narrow appressed spines; interbase broadly dilated at near midlength, thence extended into a long spine; apical lobes of basistyle unequal, both with spinoid setae.

Male.—Length about 6 mm.; wing 6.2 mm.; antenna about 0.85 mm.

Rostrum dark gray, palpi black. Antennae short, black throughout; proximal flagellar segments oval, the outer ones more slender and elongate, terminal segment subequal to the penultimate. Head dark gray.

Pronotum dark gray. Mesonotal praescutum gray, with three stripes, the broad central one conspicuously blackened, not attaining the suture, lateral stripes dull pruinose; remainder of notum and pleura gray pruinose. Halteres whitened, the outer half of knob infuscated. Legs with coxae brownish gray; trochanters obscure yellow; femora and tibiae light brown, tarsi darker brown. Wings whitened, the long-oval stigma brown, distinct; veins brown. Venation: *Sc* long, Sc_1 ending nearly opposite the supernumerary crossvein in cell R_1; R_{2+3+4} longer than basal section of R_5; *m-cu* beyond midlength of M_{3+4}.

Abdomen, including the hypopygium, brownish black. Male hypopygium with the tergite large, transverse, the lateral arms distinctive, each extended into a large flattened blade that splits into two long slender appressed points, median tergal margin broadly and very gently convex with strong setae from conspicuous tubercles. Basistyle with interbase very large, generally as in *Dicranota (Rhaphidolabis) subsessilis* and some others, broadly dilated at near midlength, thence extended into a long spine; apex of basistyle bilobed, one lobe subglobular, with very sparse spinoid setae, the second lobe longer and more slender, elongate-oval, with more numerous spinoid setae. Dististyle gently arcuated, at apex with several long setae. Aedeagus not blackened.

Habitat.—California (San Bernardino County).

Holotype, ♂. Thurman Flats, Mill River, 3,400 feet, May 11, 1963 (C. P. Alexander).

This is the first record of occurrence of a member of the typical subgenus from California, the only other regional species being *Dicranota (Dicranota) parvella* Alexander, of Oregon, which is quite distinct from the present fly in hypopygial characters. The structure of the lobes of the ninth tergite is different from that of any member of the genus so far made known.

Limnophila (*Idioptera*) *nearctica*, n.sp.

Size large, wing of male to 10 mm.; antennae of male long, nearly two-thirds the wing; wings pale yellow with a solidly darkened brown pattern, the areas before cord broken, not forming a continuous band as in some other species.

Male.—Length about 10-11 mm.; wing 9.5-10 mm.; antenna about 6-6.3 mm.

Rostrum brownish yellow, mouthparts and palpi black. Antennae of male very long, nearly two-thirds the wing; scape and pedicel brown, flagellum black; segments elongate, with dense white erect setae that are about half as long as the sparse black verticils. Head brownish gray, sparsely dusted with yellow pollen; anterior vertex carinate.

Pronotum brownish gray, pretergites obscure yellow. Mesonotal praescutum dark gray with four obscure more blackened stripes, centers of scutal lobes similarly darkened; posterior scutal callosities, scutellum and mediotergite light gray, pleurotergite more yellowed. Pleura with mesepisternum clear gray, the remainder paler, grayish yellow. Halteres with stem yellow, knob infuscated. Legs with coxae and trochanters yellowed; femora yellow, tips broadly black; tibiae yellow, bases narrowly, tips slightly more blackened; basitarsi yellowed, outer segments more infuscated. Wings pale yellow, prearcular and costal fields more saturated yellow, conspicuously patterned with brown, the areas solid, not pale brown with darker margins as in *mcclureana;* disconnected dark areas at arculus, on *R* before middistance to origin of *Rs*, cord, outer end of cell *1st* M_2, and broad seams over origin of *Rs*, supernumerary crossvein in cell *M* and tip of vein *2nd A*, all disconnected; further brown marginal darkenings at ends of longitudinal veins, including the narrow wing tip; veins brownish yellow, darker in the pattern areas. Venation: petiole of cell M_1 longer than the cell; in holotype, the posterior end of the crossvein in cell M is atrophied.

Abdomen brownish yellow, the two subterminal segments blackened to form a narrow ring, hypopygium yellowed. Male hypopygium with outer dististyle glabrous, gently curved to the acute tip, inner style with erect pale setae. Gonapophysis terminating in an acute spine, the outer margin beyond midlength with one or more weak spinules.

Habitat.—Canadian North West territories.

Holotype, ♂, Aklavik, District of Mackenzie, June 27, 1931 (Owen Bryant). Paratopotypes, ♂♂, June 23-July 15, 1931.

There are six species in the subgenus *Idioptera* Macquart, including besides the present fly, *Limnophila* (*Idioptera*) *fasciata* (Linnaeus, *L.* (*I.*) *macropteryx* Tjeder, and *L.* (*I.*) *pulchella* (Meigen), of northern Europe, and *L.* (*I.*) *fasciolata* Osten Sacken and *L.* (*I.*) *mcclureana* Alexander, of northern North America. The present fly is the largest of the known species, being readily told from the others by the wing pattern and by the length of the antennae. In *pulchella* the females are brachypterous, the wings being less than

one-fifth the size of those of the male. The female sex is unknown in *mcclureana* and in the present fly.

Rhabdomastix (*Sacandaga*) *hynesi*, n.sp.

Allied to *trichophora;* general coloration of praescutum and scutum yellow, conspicuously patterned with light brown, the ventral pleura more heavily darkened; antennae with scape yellow, the enlarged pedicel black; head brownish yellow with a conspicuous dark brown central stripe; wings grayish yellow, the prearcular and costal fields pale yellow; macrotrichia of outer radial veins excepting R_5 sparse or lacking; *m-cu* at or near midlength of M_{3+4}; male hypopygium with outer dististyle long and narrow, parallel-sided for most of the length, terminating in a strong appressed spine; apices of gonapophyses dilated into long narrow blades.

Male.—Length about 6.5-7 mm.; wing 6-6.5 mm.; antenna about 1.3-1.4 mm.

Described from alcoholic materials. Rostrum yellow, palpi darker. Antennae with scape yellow, the large pedicel black, flagellum brownish black; proximal flagellar segments short and crowded, the remainder long-cylindrical, shorter than their longest verticils. Head brownish yellow to brown, posterior vertex with a broad conspicuous dark brown central stripe, extending from the low tubercle to the occiput, narrowed behind.

Prothorax yellow. Mesonotal praescutum yellow with three conspicuous light brown stripes, the median one darker at anterior end; scutum yellow, each lobe with a single light brown area that is confluent with the lateral praescutal stripe; remainder of notum light yellow, weakly darkened posteriorly. Pleura yellow with a small V-shaped brown area between the propleura and mesepisternum and along the suture between the anepisternum and sternopleurite; ventral sternopleurite and meron conspicuously dark brown. Halteres pale yellow. Legs with coxae yellow, anterior face of fore pair weakly darkened; trochanters yellow; remainder of legs yellowish brown. Wings tinged with grayish yellow, the prearcular and costal fields pale yellow; stigma very pale brown, scarcely evident; veins light brown, more brownish yellow in the brightened fields. Macrotrichia of veins relatively sparse, lacking on *Sc*, *Rs*, R_{2+3+4}, R_3 and R_4; a scattered series over the entire length of distal section of R_5; sparse trichia at ends of outer medial veins, more extensive on M_{1+2}. Venation: *Sc* relatively long, Sc_1 ending about opposite three-fourths *Rs*, Sc_2 faint but present, Sc_1 alone longer than *m-cu*; R_{2+3+4} subequal to R_4; distal section of M_{1+2} arched;*m-cu* at near midlength of M_{3+4}; vein *2nd A* sinuous at near midlength.

Abdomen yellow, the median area of first and second tergites brown, succeeding segments with bases pale brown; hypopygium yellow. Male hypopygium with outer dististyle long and narrow, parallel-sided for most of the length, terminating in a strong appressed spine, outer margin with much smaller denticles; inner style

stout, its outer end narrowed. Apex of each gonapophysis dilated into a long narrow blade that is about twice as wide as the stem.

HABITAT.—California (Amador and Sierra Counties).

HOLOTYPE, alcoholic ♂, Sierra County, without more exact data, June 26, 1965 (C. D. Hynes). PARATYPE, alcoholic ♂, Foster Meadow, Amador County, July 2, 1965.

The species is named for Dr. C. Dennis Hynes who discovered it and many other new and rare species of crane flies. It is closely related to *Rhabdomastix* (*Sacandaga*) *megacantha* Alexander and *R.* (*S.*) *trichophora* Alexander which are similar in general appearance being most readily distinguished by details of coloration, venation and vein trichiation, and in slight details of the male hypopygium.

Cheilotrichia (*Empeda*) *aklavikensis*, n.sp.

General coloration of head and abdomen yellow; thoracic praescutum, scutum and pleura chiefly dark brown; femora and tibiae yellow, the tips dark brown; wings relatively long and narrow, yellow, cell M_2 open by atrophy of basal section of M_3, cell *2nd A* narrow; male hypopygium with outer dististyle unequally forked, the inner arm again more shallowly emarginate, with several blackened spines; apex of phallosome with margin nearly truncate or very slightly emarginate.

MALE.—Length about 4 mm.; wing of holotype 4.4 x 0.8 mm.

FEMALE.—Length about 4.5-5 mm.; wing 4.5-5 mm.

Rostrum yellowish brown, palpi dark brown, antennae with scape yellow, remainder dark brown; flagellar segments short-oval. Head with front and anterior vertex very pale yellow, posterior vertex darker yellow, the central area slightly infuscated; anterior vertex broad, eyes small.

Pronotum brownish yellow, pretergites clearer yellow. Mesonotal praescutum chiefly dark brown with a vague obscure yellow central vitta; scutal lobes similarly dark brown; scutellum and postnotum obscure yellow. Propleura reddish brown; mesepisternum brown, the posterior pleurites more brownish yellow. Halteres with stem yellowed, knob brown. Legs with coxae and trochanters yellowish brown; femora and tibiae yellow, tips narrowly dark brown; femora chiefly dark brown, the proximal half or more of basitarsi obscure yellow. Wings relatively long and narrow, as shown by the measurements of the type; ground color yellow, the prearcular and costal fields clearer yellow; veins pale brown, clear yellow in the brightened fields. Venation: Sc_1 ending some distance beyond origin of *Rs;* the latter subequal in length to petiole of cell R_3; vein R_3 oblique; R_4 subequal to and in direct alignment with R_{3+4}; cell M_2 open by atrophy of basal section of M_3; *m-cu* at fork of M, cell *2nd A* narrow.

Abdomen of male orange yellow, including hypopygium; in some females the abdomen much darker, ovipositor very large. Male hypopygium with outer dististyle unequally forked, the longer outer

arm a narrow blade, inner arm shallowly bifurcate. its outer branch including a cluster of several blackened spines from a common base. Phallosome with apex nearly truncate to very slightly emarginate, the broad lateral arms with two or three protuberances.

Habitat.—Canadian North West territories.

Holotype, ♂, Aklavik, District of Mackenzie, July 1, 1931 (Owen Bryant). Allotopotype, ♀, July 9, 1931. Paratopotypes, 4 ♀ ♀, July 1-18, 1931.

There are several species of the subgenus in the Pacific Northwest (Alexander, C. P., 1955, University of Michigan, Mus. Zool.. Miscell. Publ. 90:13-16, figs. 1-5, 7-10), all being dark-colored flies with the hypopygia quite distinct. The venation of the present fly, with cell M_2 open by atrophy of basal section of vein M_3 provides a character unique in the subgenus.

TINGIDAE, NEIDIDAE (BERYTIDAE) AND PENTATOMIDAE OF THE NEVADA TEST SITE[1]

D Elden Beck[2] and Dorald M. Allred[2]

Introduction

This report is another in the continuing series of publications concerned with the results of ecological observations of fauna at the United States Atomic Energy Commission Nevada Test Site. These reports are concerned with investigations being conducted by the Department of Zoology and Entomology of Brigham Young University in cooperation with the United States Atomic Energy Commission (Allred, *et al.*, 1963). Most of the earlier reports refer to studies of vertebrate organisms and ground-inhabiting invertebrates. Some studies have been directed to parasitic arthropods. For a recent listing of these publications refer to Allred, *et al.* (1966).

During the last several years emphasis has been given to collecting arthropods from known species of plants. The principal objective is to show the association between species of animals and plants. Although main attention has been given to collections during the flowering season, follow-up visits have also been made at other times. We are aware of the collection of a specimen in what may be termed an accidental visit by an animal organism to a species of plant. Such an accidental type of relationship we have tried to differentiate by making collections from several specimens of the plant species at separate localities.

Collections were made mostly by insect net sweeping, vigorously shaking the plant into the open net, picking organisms by hand from the plant, or severely beating larger bushes or trees while a net was held beneath the plant. Some collections were made by use of ultraviolet and incandescent light sources in specially-designed traps. They were so designed that individual specimens of species could be taken separately. Such collections were made in plant communities greatly predominated by one or two plant species.

For convenience of reference, a map to our areas of study is included (Figure 1). These subdivisions of the test site are not to be interpreted as biotic units, but they are divisions of convenience so a more accurate identification of a locality may be made. (See Allred *et al.*, 1963, for a detailed description of biotic community subdivisions.) The designation of the title "Host Plant Species" in Table I is an arbitrary term of identity on our part. Actually the insect-plant association at the time of our collection may have been a single visit. Nevertheless, this was the association we found when a collection was made at a given date.

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2 Department of Zoology and Entomology, Brigham Young University, Provo, Utah.

The classification of the Tingidae and the Neididae (Berytidae) was done by Dr. Richard C. Froeschner, Curator, Department of Entomology, at the U. S. National Museum. The Pentatomidae were identified by the late Dr. Herbert Ruckes, Department of Entomology, at the American Museum of Natural History. This latter courtesy was most likely the last service he performed, for the following week after we received his taxonomic analysis of our specimens, we learned of his untimely death. We are indeed grateful to these men for their help in the identifications. Instrumental in making some of the collections were Clyde M. Pritchett and Jose M. Merino, graduate students at Brigham Young University. We were assisted in plant classification by Dr Janice C. Beatley, Curator of the Nevada Test Site Herbarium, and a member of the test site ecology staff from the University of California at Los Angeles.

Results

The data are arranged in tabular form. Table I comprises the Tingidae; Table II, the Neididae (Berytidae); and Table III, the Pentatomidae.

Discussion

Tingidae

Corythucha mollicula was found on a variety of plant species. Nevertheless, the greatest numbers were collected from *Gutierrezia sarothrae* and *G. microcephala*. There seemed to be no general preference for the tingid *Corythucha sphaeralceae*. This seemed rather unusual in that during the summer of 1965 there was a rank growth of *Sphaeralcea* sp. over thousands of acres of desert land. Only one specimen of *Dictyla coloradensis* was collected, yet many *Astragalus lentiginosus* were sampled. *Gargaphia opacula* was the most generally distributed tingid with reference to geography and plant species association. If there were any plant preference, it may have been *Eurotia lanata*. It also had an extended seasonal occurrence, being taken in January, April, May, June, July, and August from *Eurotia lanata*. The only tingid which appeared to be host specific was *Teleonemia nigrina*, collected from *Verbena bracteata*. Drake and Ruhoff (1965) listed six host-plant species, not including sugar beets and snapdragon flowers. *Eriogonum* sp. and *Verbena* sp. are also host plants. Checked with data from the Drake-Ruhoff catalogue, all tingids listed in this report are new records for Nevada. The host-plant associations have significantly added to those already known.

Neididae (Berytidae)

As a group, the fragile hemipteran "Stilt Bugs" were widely distributed over the test site. The most abundant species was *Jalysus wickhami*. Although found on other species of plants, there was a preference for *Eriogonum inflatum*, *E. deflexum*, and *E. nodosum*. The 1965 collections were taken when these species were in flower.

Pronatocantha annulata showed no host-plant preference. It is interesting to note, however, that specimens of this species were not taken from any species of *Eriogonum*. Only three specimens of *Neides muticus* were collected. One was from *Gilia* sp., and two others from the pinyon-pine, *Pinus monophylla*.

Pentatomidae

For the most part those "Stink Bugs" taken before 1964 as listed in Table III were collected in pit-fall can traps. This type of collecting was done to obtain a sample of organisms whose habit in part or entirely confined them to ground surface travel and living in selected biotic communities. Such collecting would not reveal the specific plant association by an organism. This in part explains the blank space beneath the heading "Plant Host(s)." Subsequent to 1963 the collections of pentatomids were directed to taking specimens from the plants themselves. The most commonly encountered species, *Chlorochroa sayi*, has a wide geographic and seasonal distribution. When data from pit-fall can traps are used plus records from plants in flower, the seasonal distribution was February through September, except May and July. There are not sufficient data to indicate plant preference. One may generalize from the data at hand that this species of stink bug is more or less a lowland-basin inhabitant at the test site On the other hand, *Thyanta rugulosa* appears to be relegated to slightly higher elevations. *Atriplex canescens* was the plant on which most specimens of this species were found. Although *Thyanta pallidovirens spinosa* was generally distributed about the test site, it did not evidence any specific plant species as a preferred host. Five additional species of pentatomids were collected, including a possible new species of *Dendrocoris*. Most collections such as *Brochymena sulcata* and *Banasa euchlora* were taken only as single specimens. Five specimens of *Dendrocoris contaminatus* and three of *Prionosoma podopioides* were collected.

References

Allred, D. M., D E. Beck, and C. D. Jorgensen. . 1963. Biotic communities of the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser., 2(2): 1-52.

———. 1966. A summary of the ecological effects of nuclear testing on native animals at the Nevada Test Site. Proc. Utah Acad. Sci., Arts, and Letters (in press).

Beatley, J. C. 1965. Ecology of the Nevada Test Site. I. Geographic and ecologic distributions of the vascular flora (Annotated check-list). Univ. of Calif. at Los Angeles, School of Medicine, Dept. of Biophysics and Nuclear Medicine.

Drake, C. J. and F. A. Ruoff. 1965. Lacebugs of the world: A catalog (Hemiptera: Tingidae). United States National Museum, Bull. 243.

Froeschner, R. C. 1942. Contributions to a synopsis of the Hemiptera of Missouri. Pt. II. Coreidae, Aradidae, Neididae. Amer. Mid. Nat., 27(3):591-609.

Munz, P. A., and D. D. Keck. 1959. The California flora. Univ. of Calif. Press, Berkeley.

Tidestrom, I. 1925. Flora of Utah and Nevada. Contributions from the U. S. Nat'l. Herbarium, Vol. 25.

TABLE I. Collection Records for Tingidae Taken at the Nevada Test Site.

SPECIES	PLANT HOST(S)	LOCALITY	DATE	NO. OF SPECIMENS
Corythucha mollicula Osborn & Drake	*Tetradymia glabrata*	17	1 Jy 65	1
	Artemisia sp.	18	8 Jy 65	1
	Gutierrezia sarothrae	5	16 Jy 65	28
	G. microcephala	410	27 Jy 65	60
	Franseria acanthicarpa	17		4
			5 Ag 65	3
	Eriogonum deflexum	16		1
	Hymenoclea salsola	5	12 Ag 65	2
	Franseria acanthicarpa	16	19 Ag 65	8
		17	26 Ag 65	2
Corythucha sphaeralceae Drake	*Artemisia* sp.	18	8 Jy 65	7
	?			1
	Sphaeralcea sp.	12	11 Ag 65	2
		23	18 Ag 65	6
	Franseria acanthicarpa	16	19 Ag 65	1
	Sphaeralcea sp.	18	23 Ag 65	2
Dictyla coloradensis (Drake)	*Astragalus lentiginosus*	17	11 Jn 65	1
Gargaphia opacula Uhler	*Eurotia lanata*	6	17 Ag 60	2
		4	23 Ja 61	1
	Eurotia lanata	6	31 Ja 61	1
			24 Ap 61	1
			20 My 61	1
			21 Jn 61	8
	Atriplex canescens			1
	Eurotia lanata		24 Jy 61	2
	Purshia tridentata	28	28 Jy 62	1
	Eurotia lanata	16	11 Jn 65	9
	Machaeranthera leucanthemifolia			2
	Chaenactis stevioides	5	12 Jn 65	1
	Opuntia acanthicarpa	14	14 Jn 65	1
	Coleogyne ramosissima	16	11 Jn 65	1
	Acamptopappus shockleyi	6	15 Jn 65	1
	Malacothrix glabrata	401	18 Jn 65	1
	Atriplex canescens		20 Jn 65	1
	Dalea polydenia	16	19 Ag 65	1
Teleonemia nigrina Champion	*Verbena bracteata*	5	13 Jn 65	17
			Total	183

TABLE II. Collection Records for Neididae (Berytidae) Taken at the Nevada Test Site

SPECIES	PLANT HOST(S)	LOCALITY	DATE	NO. OF SPECIMENS
Neides muticus (Say)	*Gilia* sp.	12	21 Jn 60	1
	Pinus monophylla		15 Ag 65	1
			25 Ag 65	1
Pronotacantha annulata Uhler	?	5	19 O 60	1
	Bromus rubens	28	21 Jy 62	3
	Penstemon palmeri	12	14 Jy 64	8
	P. floridus	12	15 Jy 64	1
	Phacelia peirsoniana		11 Jn 65	1
	Salvia dorrii			1
	Malacothrix glabrata	17	12 Jn 65	1
	Castilleja sp.	5	13 Jn 65	1
	Oenothera californica	17	16 Jn 65	1
	Ribes sp.	12	13 Ag 65	2
Jalysus wickhami Van Duzee	*Elymus cinereus*	5	27 Jy 61	1
	Artemisia tridentata	16	31 Jy 61	1
	?	5	2 O 61	1
	Sphaeralcea ambigua	5	11 Jn 64	1
	Eriogonum inflatum	6	19 Jy 65	1
	?	23	3 Ag 65	3
	?		4 Ag 65	8
	?		5 Ag 65	1
	Eriogonum deflexum	16		5
	E. nodosum	17		1
	E. deflexum	12	6 Ag 65	2
	?	17	8 Ag 65	1
	Sphaeralcea sp.	16	11 Ag 65	1
	Eriogonum deflexum			2
	?	23	12 Ag 65	1
	Eriogonum deflexum	5		23
	?	23	15 Ag 65	1
	Eriogonum deflexum	410	16 Ag 65	46
	Eriogonum sp.	16	17 Ag 65	1
	E. deflexum		19 Ag 65	4
			20 Ag 65	1
	Eriogonum inflatum	6		6
	E. deflexum	12	23 Ag 65	1
	Chenopodium leptophyllum	18		1
	Eriogonum nodosum			2
			Total	139

TABLE III. Collection Records for Pentatomidae Taken at the Nevada Test Site

SPECIES	PLANT HOST(S)	LOCALITY	DATE	NO. OF SPECIMENS
Chlorochroa sayi Stål	?	1	15 S 60	1
	Salsola kali		19 S 60	1
	?		16 F 61	1
	Astragalus sp.	4	12 Mr 61	1
	?	1	16 Mr 61	5
	?		20 Mr 61	2
	?		27 Mr 61	4
	?		30 Mr 61	6
	?		6 Ap 61	4
	?		10 Ap 61	4
	?		17 Ap 61	1
	?		20 Ap 61	2
	?		24 Ap 61	1
	?		1 S 62	1
	?		3 S 62	1
	Stanleya pinnata	5	12 Jn 64	2
	Lepidium fremontii	9	10 Jn 65	6
	Stanleya pinnata	5	12 Jn 65	2
	Grayia spinosa	401	18 Jn 65	4
	Purshia glandulosa		20 Jn 65	1
	Chrysothamnus sp.	12	7 Ag 65	1
	Chenopodium leptophyllum	17	8 Ag 65	1
	?	23	10 Ag 65	1
	Sphaeralcea sp.	401	11 Ag 65	1
	Stanleya pinnata	5	12 Ag 65	6
			13 Ag 65	4
	?	23	15 Ag 65	2
	?		18 Ag 65	2
	Salsolia kali	5		1
	?	16	19 Ag 65	2
	Stanleya pinnata		20 Ag 65	1
	Atriplex canescens	17	25 Ag 65	1
	Stanleya pinnata	5	28 Ag 65	8
	?	23	29 Ag 65	1

Thyanta rugulosa (Say)	?	5	10 Mr 61	1
	Lycium sp.		14 Jn 61	1
	Rumex salicifolius (S)		27 Jy 61	1
	Artemisia tridentata	16	23 Jy 62	1
	?	12	25 Jy 62	1
	Purshia tridentata	28	28 Jy 62	1
	Artemisia tridentata	16	31 Jy 62	1
	?	5	20 Jy 65	1
	?	18	22 Jy 65	1
	Atriplex canescens	17	5 Ag 65	3
	?	23	12 Ag 65	1
	?		15 Ag 65	11
	Atriplex canescens	16	19 Ag 65	2
		17	25 Ag 65	21
		12		2
		5	28 Ag 65	42
Thyanta pallidovirens spinosa Ruckes	*Larrea divaricata*	401	2 Ag 62	1
	?	18	3 Ag 62	1
	Baileya pleniradiata		13 Jy 64	2
	Rumex salicifolius	12	19 Jy 64	1
	?		9 Ag 64	1
	?	16	11 Ag 64	1
	?	5	19 Jy 65	2
	?	410	21 Jy 65	3
	?	23	5 Ag 65	1
	Sphaeralcea sp.	16	11 Ag 65	1
	?	23	15 Ag 65	1
	Elymus cinereus	12	23 Ag 65	1
Banasa euchlora Stål	?	12	9 Ag 64	1
Brochymena sulcata Van Duzee	*Pinus monophylla*	18	20 Jn 65	1
Dendrocoris sp. novum (?)	*Pinus monophylla*	18	20 Jn 65	3
Dendrocoris contaminatus Uhler	*Larrea divaricata* (L)	CE	3 Ag 61	1
	Viguiera multiflora	16	19 Ag 65	1
	Larrea divaricata	5	28 Ag 65	3
Prionosoma podopioides Uhler	?	1	19 Jn 61	1
	?	1	26 Jn 61	1
	?		21 Jy 61	1
			Total	202

FIGURE I. Numbered collecting areas at the Nevada Test Site. These were delineated in 1965 for use of by the Brigham Young University ecology study group.

NEW SYNONYMY IN THE PLATYPODIDAE AND SCOLYTIDAE (COLEOPTERA)[1]

Stephen L. Wood[2]

During the past several years I have had the opportunity to examine numerous types of species in the families Platypodidae and Scolytidae. A number of synonyms not previously published have been discovered and several species have been found that were assigned to the wrong genus. On the following pages new synonymies and new combinations are presented for American species or those that affect the nomenclature of American species.

Platypodidae

Platypus coronatus Schedl

Platypus coronatus Schedl, 1933, Revista Ent. 3:170 (Vara Blanca, Costa Rica; Schedl Collection).

Platypus platyurius Schedl, 1933, Revista Ent. 3:176 (Santiago, Costa Rica; Schedl Collection). *New synonymy.*

The female holotype of *coronatus* Schedl was compared directly to females and the male holotype of *platyurius* Schedl to males that were collected in series from their tunnels at Cerro de la Muerte, San José Prov.; Volcan Poas, Heredia Prov.; and Volcan Irazu, Cartago Prov., Costa Rica. The first series came from *Brunnelia costaricensis*, the second from an unknown log, possibly *Cedrus*, and the third from *Alnus acuminata* and *Quercus* sp. Because the sexes were definitely associated it is clear that the two names designate the same species.

Platypus equadorensis Schedl

Platypus equadorensis Schedl, 1933, Ann. Mag. Nat. Hist. (10)12:396 (Type label reads "Cachabé, low c., xi. 96, Rosenberg, Equador"; British Mus. Nat. Hist.)

Platypus manipularis Schedl, 1937, Proc. Roy. Ent. Soc. London (B)6:14 (Type label reads "Cachabé, low c., I. 97, Rosenberg"; British Mus. Nat. Hist.). *New synonymy.*

When the two male holotypes of *equadorensis* Schedl and *manipularis* Schedl were compared directly, differences were not apparent. The name *manipularis* Schedl should, therefore, be placed in synonymy under the older name *equadorensis* Schedl.

Platypus pini Hopkins

Platypus pini Hopkins, 1905 (1906), Proc. Ent. Soc. Washington (Preprint) 7:71 (Chaleo, Mexico; U.S. Nat. Mus.).

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2 Department of Zoology and Entomology, Brigham Young University, Provo, Utah, Scolytoidea contribution No. 28.

Platypus quadridens Schedl, 1937, Ent. Blätt. 33:38 (Sierra de Durango, Mexico; Schedl Collection). *New synonymy.*

The male holotype of *pini* Hopkins was compared to my series from Mexico and the western United States (Wood, 1958. Gt. Basin Nat. 18:37) and found to represent a relatively common species that attacks the stumps and lower bole of certain species of *Pinus*. The male type of *quadridens* Schedl was recently examined and compared directly to representatives of my series and found to be identical. Schedl's name, therefore, should be placed in synonymy under *pini* Hopkins.

New locality records for this species include 60 miles west of Durango, Durango, Mexico, and Cerro Peña Blanca, Honduras (from *Pinus pseudostrobus*).

Scolytidae

Ancylоderes Blackman

Ancyloderes Blackman, 1938, Proc. Ent. Soc. Washington 40:205 (*Cryphalus pilosus* Leconte, original designation).

Blackman's genus *Ancyloderes* was placed in synonymy under the genus *Conophthocranulus* Schedl by Schedl in 1950 (Dusenia 1:46). Recently the type species *blackmani* Schedl and all species presently included in *Conophthocranulus* were examined. While *Ancyloderes* and *Conophthocranulus* are both properly placed in the Pityophthorini they are not at all closely related. *Ancyloderes* is rather closely allied to *Gnathotrichus* Eichhoff and *Conophthocranulus* to *Conophthorus* Hopkins.

Brachyspartus Ferrari

Brachyspartus Ferrari, 1867, Die Forst- und Baumzuchtschädlichen Borkenkäfer, p. 65 (*Brachyspartus moritzi* Ferrari, monobasic).

Thylurcos Schedl, 1939, Mitt. Münchner Ent. Ges. 29:567 (*Corthylus moritzi* Ferrari, original designation?). *New synonymy.*

When Schedl established the genus *Thylurcos* he evidently overlooked the fact that one of the two species he included in it, *Brachyspartus moritzi* which he had previously referred to *Corthylus*, was the type-species of the monobasic genus *Brachyspartus*. It is implied, but not clearly stated, that *moritzi* is also the type-species of *Thylurcos*. If this is correct, then the two genera are objective homonyms of one another. If not, then I here designate *Brachyspartus* (or *Corthylus*) *moritzi* Ferrari as the type-species of *Thylurcos* in order to remove all doubt from the identity of the genus.

The above action leaves the genus that has been known as *Brachyspartus* in the literature, without a name. The following is presented to fill this need.

Corthylocurus, n.g.

Brachyspartus: Blandford, 1904, Biol. Centr.-Amer., Coleopt. 4(6):264.

As indicated above the generic name *Brachyspartus* is fixed by its type-species designation to *moritzi* Ferrari which is generiсly

different from most of the species that have been assigned to *Brachyspartus*. Since this genus is without a name, I propose the name *Corthylocurus* for it. The new genus is characterized as follows.

Corthylocurus is allied to *Corthylus* Erichson and *Brachyspartus* Ferrari, but is distinguished from the former by the more simple, uniformly pubescent antennal club with a special cirrus poorly developed and with two simple sutures; fore tibiae subinflated and with minute tubercles on the posterior face. It is distinguished from *Brachyspartus* by the two sutures of the antennal club and by the entire elytral apex. The type-species of *Corthylocurus* is *Brachyspartus barbatus* Blandford (*op. cit.*, p. 265).

A revision of the genus is in preparation.

Ips DeGeer

Ips DeGeer, 1775, Memoires pour servir a l'histoire des insectes 5:190 (name validated); Hopkins, 1914, Proc. U.S. Nat. Mus. 48:124 (*Dermestes typographus* Linnaeus, designated type-species).

In preparing for a revision of the Scolytidae for Genera Insectorum, Schedl (1964, Reichenbachia 2:218) grouped most of the genera of the tribe *Ipini* into the one genus *Ips* DeGeer. Schedl's action is consistent with a somewhat similar grouping by Hagedorn (1910, Gen. Ins. 111:101) and certainly was not taken without considerable study and thought. However, it is felt that a more extensive and detailed study of all possible anatomical parts exhibiting variation should be completed before such drastic grouping of widely recognized genera is accepted. Following such a study some of the genera, such as *Orthotomicus* Ferrari, almost certainly will fall into synonymy. It is also felt that the genus *Mimips*, not mentioned by Schedl, will occupy an important place in determining the generic limits within this group. Until such a study is completed I prefer to recognize *Ips* DeGeer, *Orthotomicus* Ferrari, *Acanthotomicus* Blandford, *Pityokteines* Fuchs, and *Orthotomides* Wood as distinct genera.

Monarthrum Kirsch

Monarthrum Kirsch, 1866, Berliner Ent. Zeitschr. 10:213 (*Monarthrum chapuisii* Kirsch, monobasic).

Cosmocorynus Ferrari, 1867, Die Forst- und Baumzuchtschädlichen Borkenkäfer, p. 62 (*Cosmocorynus cristatus* Ferrari, monobasic).

Pterocyclon Eichhoff, 1868, Berliner Ent. Zeitschr. 12:277 (Original description); Hopkins, 1914, Proc. U.S. Nat. Mus. 48:128 (*Pterocyclon laterale* Eichhoff, designated as the type-species).

Recently I collected a common species of ambrosia beetle in Mexico, from *Quercus* sp., that was identified as *Pterocyclon laterale* from the works of Eichhoff and Blandford. Upon comparing my males with Blandford's Biologia Centrali-Americana material of this species, two males from Mexico, they were found to belong to the same species. In the Schedl collection Eichhoff's species was not named as such, but the female was represented by the unique type of *Cosmocorynus trifasciatus* Schedl. After encountering this pre-

sumed synonymy involving the type-species of *Monarthrum* in the male of *laterale* and its female *Cosmocorynus trifasciatus*, the type species of *Cosmocorynus*, *cristatus* Ferrari, was examined. The species *laterale* and *cristatus* obviously are congeneric, but *cristatus* appears more closely allied to the type species of *Monarthrum*, *chapuisi* Kirsch, and to other species assigned to *Monarthrum* by Eggers (1935, Revista Ent. 5:78), than to *laterale*.

From the above examination of all three type-species and other species belonging to this species group, it is clear that *Monarthrum* Kirsch (1866), *Cosmocorynus* Ferrari (1867) and *Pterocyclon* Eichhoff (1868) are synonymous. Since *Monarthrum* Kirsch is the senior name it should be used to designate the genus. Eichoff's (1869, Berliner Ent. Zeitschr 8:299) contention that *Monarthrum* Kirsch has no status because of an error in recording the number of funicular segments in the original description is invalid under the International Code of Zoological Nomenclature.

Pteleobius Bedel

Acrantus Broun, 1882, Ann. Mag. Nat. Hist. (5)9:409 (*Homarus mundulus* Brown, monobasic). *Preoccupied.*

Pteleobius Bedel, 1888, Ann. Soc. Ent. France (hors ser.) 6:392-3, 411. (Name validated); Hopkins, 1914, Proc. U. S. Nat. Mus. 48:128 (*Bostrichus vittatus* Fabricius, designated type-species).

In a previous reference to this genus (Wood, 1962, Gt. Basin Nat. 22:77) the possibility of synonymy between *Pteleobius* Bedel and *Dendrotrupes* Broun was made. Since that time I have examined the types of all four of Broun's species that were referred to his genera *Acrantus* and *Dendrotrupes*. It is now clear that my series of *Acrantus opacus* were actually of *Dendrotrupes costiceps;* therefore, the genus *Dendrotrupes* is distinct from *Pteleobius*. The type-species of *Acrantus*, *Homarus mundulus* Brown, and the type-species of *Pteleobius*, *Bostrichus vittatus* Fabricius, however, are congeneric. As I indicated earlier (Wood, *loc. cit.*), the name *Acrantus* is preoccupied and must be replaced by *Pteleobius*.

For new synonomy of species involved in these genera see the alphabetical listing of species below.

Trypodendron Stephens

Trypodendron Stephens, 1830, Illustrations of British Entomology, Mandibulata 3:353 (Original description included (1) *Dermestes domesticus* Linnaeus and (2) *Bostrichus dispar* Fabricius); Westwood, 1838, Synopsis of the Genera of British Insects, p. 39 (Typical species: *domesticum* L.); Thompson, 1859, Skandinaviens Coleoptera Synoptiskt Bearbetade 1:146 ("Typus: T. domesticum Lin.")

Xyloterus Erichson, 1836, Archiv Naturgesch. 2(1):60 (Original description included (1) *Dermestes domesticus* Linnaeus, (2) *Bostrichus lineatus* Olivier, and (3) *Bostrichus 5-lineatus* Adams); Thompson, 1859, Skandinaviens Coleoptera Synoptiskt Bearbetade 1:46 (Typus: *Xyloterus lineatus* Gyllenhall, which, by Gyllenhall's citation, was *Bostrichus lineatus* Oliver).

In attempting to clarify the status of *Trypodendron* Stephens and *Xyloterus* Erichson, Schedl (1964, Reichenbachia 2:211-212) correctly points out that Stephens' description of *Trypodendron* refers to *Bostrichus dispar* Fabricius, the first species listed, and not to *Dermestes domesticus* Linnaeus, the other species included in the original description of the genus. Because the two species are now placed in different genera Schedl concluded that Stephens' name *Trypodendron* should remain with *dispar* and that *domesticus* should be placed in *Xyloterus* which, under this interpretation, would become a valid genus.

Because Schedl's interpretation, based entirely on the original description of *Trypodendron*, is not consistent with the International Code of Zoological Nomenclature, as adopted by the XV International Congress of Zoology, the status of *Trypodendron* must be reexamined.

Under the Code the generic name *Trypodendron* was properly validated, both a description and two valid species were included in the original diagnosis. Since, under Article 42b of the Code, the basis of a genus is objectively defined *only* by reference to its type-species, the presently accepted concept of *Trypodendron* was fixed, not by its author, but the subsequent author who designated a type-species. Westwood (1838:39) designated *Dermestes domesticus* Linnaeus as the "typical species." Since there may be some question of the validity of Westwood's designation because of his usage of the word "typical," it is pointed out that Thompson (1859, 1:146) also designated *domesticus* Linnaeus as the type of the genus. Therefore, the wording of the original description, which actually does not fit *dispar* either, has no bearing on this problem under the present International Code of Zoological Nomenclature. *Trypodendron* Stephens remains valid and *Xyloterus* Erichson must be treated as a junior synonym.

Ancyloderes pilosus (Leconte)

Cryphalus pilosus Leconte, 1868, Trans. Amer. Ent. Soc. 2:154, 156 (Middle California; Mus. Comp. Zool.).

Ancyloderes pilosus Blackman, 1938, Proc. Ent. Soc. Washington 40:205.

Ancyloderes saltoni Blackman, 1938, Proc. Ent. Soc. Washington 40:206. (Flagstaff, Arizona; U.S. Nat. Mus.). *New synonymy.*

While the types and other specimens from the two type localities show minor differences between *pilosus* (Leconte) and *saltoni* Blackman, specimens from other localities exhibit intermediate characters that make it impossible to separate the two forms. Blackman's *saltoni*, therefore, must be placed in synonymy under the older name *pilosus* (Leconte).

In addition to the types and other specimens mentioned by Blackman (*op. cit.*, p. 206), specimens from the following localities have been examined: ARIZONA: Baboquivari Mts., Oak Creek Canyon, and Patagonia. CALIFORNIA: Pasadena. DURANGO, MEXICO: 30 miles west of El Salto. All known specimens were taken at light in oak-pine growth; the host is unknown.

Brachyspartus emarginatus (Eggers), n. comb.

Corthylus emarginatus Eggers, 1943, Mitt. Münchner Ent. Ges. 33:380 (Bolivia; Schedl Collection).

The female type of *emarginatus* Eggers exhibits antennal and declivital characters on the elytra that indicate its relationship to *moritzi* Ferrari, type-species of the genus *Brachyspartus*. This species should, therefore, be transferred from *Corthylus* to *Brachyspartus*.

Corthylus flagellifer Blandford

Corthylus flagellifer Blandford, 1904, Biol. Centr.-Amer., Colept. 4(6):255 (Toxpam, Mexico; British Mus. Nat. Hist.).

Corthylus cirrus Schedl, 1940, An. Esc. Nac. Cienc. Biol. (Mexico) 1:351 (Xochitlan, Morelos, Mexico; Schedl Collection). *New synonymy.*

Corthylus nudiusculus Schedl, 1950, Dusenia 1:156 (Comitan, Mexico; Schedl Collection). *New synonymy.*

Of Blandford's type series of ten specimens mentioned in the original description, only seven are present at this time in the British Museum (Natural History). Because a type has not previously been designated from his syntypic series of *flagellifer*, and because more than one species may be represented, I hereby designate the second male, from Toxpam, Mexico, as the Lectotype. Blandford's specimens are arranged in the order they were mentioned in the original publication. Because it has been customary to regard the first specimen in Blandford's series as the type, it is proper to select Toxpam, Mexico, as the type locality; however, of the two male specimens from this locality, the first is in comparatively poor condition, and for this reason the second was designated as the type.

A male from my series collected at Tepic, Nayarit, was compared directly to the lectotype of *flagellifer* and found to be identical in all respects except size (2.9 mm. as compared to 2.7 mm. for the lectotype). My female, taken from the same tunnel as the male, was compared directly to the types of *cirrus* Schedl and *nudiusculus* Schedl and found to be identical in all essential characters. Because there is no question concerning the association of the sexes, *cirrus* and *nudiuscullus* must be considered synonyms of *flagellifer*.

Cryphalomorphus expers Blandford, n. comb.

Hypothenemus expers Blandford, 1894, Trans. Ent. Soc. London, p. 85 (Kumamoto, Japan; British Mus. Nat. Hist.).

The type specimen of Blandford's *Hypothenemus expers* was examined and found to be a representative of the genus *Cryphalomorphus*.

Cryphalomorphus knabi Hopkins

Ernoporides knabi Hopkins, 1915, U.S. Dept. Agric. Rept. 99:34 (Cordoba, Mexico; U.S. Nat. Mus.).

Ernoporides floridensis Hopkins, 1915, U.S. Dept. Agric. Rept. 99:34 (Biscayne, Florida; U.S. Nat. Mus.). *New synonymy*

Hypothenemus ritchiei Sampson, 1918, Bull. Ent. Res. 8:295 (Jamaica; British Mus. Nat. Hist.). *New synonymy.*

Cryphalomorphus caraibicus Schedl, 1951, Dusenia 2:96 (Guadeloupe; Schedl Collection). *New synonymy.*

Cryphalomoruhps subtriatus Schedl, 1952, Dusenia 3:360 (Mexico; Schedl Collection). *New synonymy.*

This abundant and widely distributed species has been recognized with difficulty because of the variability in size and depth of the elytral punctures. The examination of several hundred specimens from Florida, Guatemala and Honduras, and individual specimens from Mexico, Jamaica, Dominican Republic, and Guadeloupe, however, leaves little doubt that only one species occurs throughout the Caribbean area. The types of *floridensis* Hopkins, *ritchiei* Sampson, *caraibicus* Schedl and *subtriatus* Schedl were examined and compared directly to my material, as were specimens from Hopkins' series of *knabi*.

The host plants of this species include a wide variety of herbaceous and woody vines. Additions to the known list of hosts include *Ipomoea* sp. (Guatemala) and *Caloncytion tamnifolium* (Honduras). Other host plants await identification.

Dendrocranulus schedli, n.n.

Dendrocranulus cucurbitae Schedl, 1939, Arb. Morph. Tax. Ent. Berlin-Dahlem 6:45 (Hamburgfarm, Costa Rica; Schedl Collection). *Preoccupied.*

With the transfer of *Xylocleptes cucurbitae* Leconte (1879, U. S. Dept. Interior, Geol. Geograph. Surv. Bull. 5:519) to the genus *Dendrocranulus* (Wood, 1961, Coleopt. Bull. 15:41), Schedl's name *cucurbitae* became a junior homonym of the name used for Leconte's species. Because no synonyms are known for this species, the new name *Schedli* is proposed to replace *cucurbiatae* Schedl.

Dendrotrupes costiceps Broun

Dendrotrupes costiceps Broun, 1881, Manual of the New Zealand Coleoptera, 2:741 (New Zealand; British Mus. Nat. Hist.).

Dendrotrupes vestitus Broun, 1881, Manual of the New Zealand Coleoptera 2:741 (New Zealand; British Mus. Nat. Hist. (*New synonymy*).

The female holotype of *costiceps* Broun was compared directly to the male holotype and cotype of *vestitus* Broun. Except for the sexual differences on the frons they are identical. After examining several dozen specimens of both sexes, it was concluded that only one species was represented. Because Hopkins (1914) designated *costiceps* as the type-species of *Dendroterus*, it is here given priority over *vestitus*.

Gnathotrupes fimbriatus Schedl, n. comb.

Gnathotrichus fimbriatus Schedl, 1955, Rev. Chilena Ent. 4:259 (P. Arenas, Chile; Schedl Collection).

Following a study of the type-species of the genus *Gnathotrupes* Schedl and of part of the type series of *firbriatus* Schedl, it was ap-

parent that *fimbriatus* should be transferred from the genus *Gnathotrichus* to *Gnathotrupes*.

Hylastes flohri (Eggers), n. comb.

Hylurgops flohri Eggers, 1930, Ent. Blätt. 26:166 (Mexico; Berlin Zool. Mus.)

The cotype of *Hylurgops flohri* Eggers, presently in the Schedl Collection, was examined and found to represent the genus *Hylastes*.

Hylocurus hirtellus (Leconte), n. comb.

Micracis hirtellus Leconte, 1876, Proc. Amer. Philos. Soc. 15:369 (Southern California: Mus. Comp. Zool.).

Presumably because the sexual dimorphism on the elytral declivity is poorly developed, *hirtellus* LeConte has been treated in the similar genus *Micracis*. Characters of the antennal club, of details of the elytra, and of the tibiae leave little doubt concerning the true affinities of this species. In order to make recent identification labels of specimens consistent with published synonymy, this species must be transferred to the genus *Hylocurus*.

Ips latidens LeConte

Tomicus latidens Leconte, 1874, Trans. Amer. Ent. Soc. 5:72 (California; Mus. Comp. Zool.).

In his placement of *latidens* LeConte and *sabinianae* Hopping in the genus *Orthotomicus*, Hopping (1963, Canadian Ent. 95:6) stressed the relationship of these species to *erosus* (Wolloston). However, he overlooked the fact that some relationship should have been established between *erosus* and *laricis* Fabricius, type-species of the genus *Orthotomicus*. The species group to which *erosus* and *latidens* belong, along with a few other species groups, is intermediate between *Ips* and *Orthotomicus* with a majority of the generic charaters favoring *Ips*. The character of the second funicular segment in Ipini, on which Hopping really based his transfer of *latidens* from *Ips*, is too unreliable for use in separating genera as measurements of his own drawings clearly show.

Mimips chiriquensis (Blandford), n. comb.

Xylocleptes chiriquensis Blandford, 1898, Biol. Centr.-Amer., Coleopt. 4(6):189 (Volcan Chiriqui, Panama; British Mus. Nat. Hist.).

Blandford's type series consists of three syntypic specimens, all apparently males. Although the first specimen has generally been regarded as the type it has never been designated. In order to fix the identity of the species, I here designate the first specimen in Blandford's series as the Lectotype of *chiriquensis*.

Monarthrum bisetosum Schedl, n. comb.

Brachyspartus bisetosus Schedl, 1954, Dusenia 5:38 (Rio Caraguata, Matto Grosso, Brazil; Schedl Collection).

The females in the type series of *Brachyspartus bisetosus* Schedl in the Schedl collection exhibit modifications of the frons somewhat similar to representatives of the *chapuisii* species group of the genus *Monarthrum*. The antennal funicle is two-segmented and the elytral declivity is also similar to that of some *Monarthrum* species. The species *bisetosus* should, therefore be transferred from *Brachyspartus* to the genus *Monarthrum* and have the gender of the specific name changed from masculine to neuter.

Monarthrum exornatum (Schedl), n. comb.

Pterocyclon exornatum Schedl, 1939, Münchner Ent. Ges. 29:575 (Colonia, Mexico; Schedl Collection).

Pterocyclon gracilicornum Schedl, 1939, Münchner Ent. Ges. 29:576 (Jalapa, Mexico; Schedl Collection). *New synonymy.*

The male holotypes of *exornatum* Schedl and *gracilicornum* Schedl were compared directly to one another and to my male specimens from Totalapan, Oaxaca, Mexico. Part of my material is intermediate between Schedl's very similar types and makes it necessary to place *gracilicornum* in synonymy under *exornatum* because of page priority.

Monarthrum laterale (Eichhoff), n. comb.

Pterocyclon laterale Eichhoff, 1868, Berliner Ent. Zeitschr. 12:278 (Mexico; type presumed lost, Hamburg Mus.). Eichhoff, 1878, Mem. Soc. Roy. Sci. Liége (2)8:439.

Cosmocorynus trifasciatum Schedl, 1950, Dusenia 1:173 (Mexico; Schedl Collection). *New synonymy.*

This distinctive species is relatively common in *Quercus* in Mexico.

Representatives were independently identified as *laterale* Eichhoff by Blandford (1905, Biol. Centr.-Amer., Coleopt. vol. 4, pt. 6:281) and by myself from the two descriptions of the male by Eichhoff. The type presumably was a unique male that was lost in the destruction of the Hamburg Museum during World War II. Under normal circumstances the name would be set aside as unidentifiable until a comprehensive revisional study could fix its position. However, *laterale* is the type of the genus *Pterocyclon* Eichoff which has had a dubious status from its beginning.

There is no mention of the number of specimens in the type series in either of Eichhoff's descriptions. The species was not present in the collection of Chapuis, a contemporary of Eichhoff who had duplicates of many of Eichhoff's species, nor was it available to Blandford for his study of Central American fauna. Because the species is not represented in the Schedl collection, where a few Eichhoff types now reside, and because no authentic representatives of the species have been reported by any of the current major authorities on Scolytidae, it is presumed the type was a unique specimen that was lost with other Eichhoff material in the destruc-

tion of the Hamburg Museum during World War II. Eggers (1929, Wiener Ent. Zgt. 46:51) studied the type, presumably at the Hamburg Museum, and correctly pointed out that Blandford's figure 18 on plate VIII does not closely resemble this species and compared the figure to the characters of the type. Blandford's specimens conform to Eggers' description, but not to the figure.

In the interest of nomenclatorial stability, I propose that the first specimen in Blandford's series of two males from Toxpam, Mexico, presently in the British Museum (Natural History), be designated as the Neotype of *Pterocyclon laterale* Eichoff, the type-species of *Pterocyclon* Eichhoff. The size, color pattern, posteriorly tapered elytra and armature of the declivity, mentioned in the description, are sufficient to distinguish it from any other known Mexican species. The neotype is slightly darker in color than the original description implies, but this could be expected in a young adult specimen attracted to light. The neotropical genus to which this species properly belongs, *Monarthrum* Kirsch, is large and very poorly known in South America. Since an adequate study of this genus is impractical in the forseeable future, it is in the interests of nomenclatorial stability that this designation of a neotype be recognized, although there may be some question as to whether this presentation qualifies as a "revisory work."

The males of my series of this species agree in all details with Blandford's specimens. Some of the females agree with the unique female type of *Cosmocorynus trifasciatus* Schedl. Because there is no question of the association of the sexes, it is apparent that the two names represent only the different sexes of the same species and, therefore, *trifasciatus* should be placed in synonymy under the older name *laterale.*

Monarthrum melanura Blandford, n. comb.

Pterocyclon melanura Blandford, 1904, Biol. Centr.-Amer., Coleopt. 4(6):272 (Volcan de Chiriqui, Panama; British Mus. Nat. Hist.).

Pterocyclon opacifrons Schedl, 1935, Revista Ent. 5:350 (Coronado, Costa Rica; Schedl Collection). *New synonymy.*

Blandford's unique male holotype of *malanura* was compared to my male from Tapanti, Cartago Prov., Costa Rica, and found to be identical in all essential characters. The female, taken from the same tunnel as my male, agrees with the unique female holotype of *Pterocyclon opacifrons* Schedl. Since the sexes have now been definitely associated, *opacifrons* must be placed in synonymy under *melanura* Blandford.

Monarthrum scutellare (Leconte)

Corthylus scutellaris Leconte, 1860, Rept. Expl. Surv. R.R. Pacific 9(1):59 (San Jose, California; Mus. Comp. Zool.).

Pterocyclon obliquecaudatum Schedl, 1935, Revista Ent. 5:351 (California; Schedl Collection). *New synonymy.*

It has long been suspected that *obliquecaudatum* Schedl was a synonym of Leconte's *Monarthrum scutellare*, but it wasn't until recently that my specimens were compared to Schedl's type. The error in identification evidently occurred because an authentic male of *scutellare* was not in Schedl's collection; all of his males were under the name of *obliquecaudatum* without an associated female. The name *obliquecaudatum*, therefore, must be placed in synonymy under *scutellare*.

Neodryocoetes limbatus (Eggers), n. comb.

Pseudopityophthorus limbatus Eggers, 1930, Ent. Blätt. 26:169 (Mexico; Schedl Collection).

The type of *limbatus* Eggers was examined and found to be a representative of the genus *Neodryocoetes*, not the genus *Pseudopityophthorus* in which it was originally described.

Pityokteines ornatus (Swaine), n. comb.

Orthotomicus ornatus Swaine, 1916, Canadian Ent. 48:185 (Williams, Arizona; Canadian Nat. Coll.).

Various American species have been referred to the genus *Orthotomicus* without reference to the type-species of that genus or its allies. This occurred with *ornatus* Swaine, although it appears to be more closely allied to *curvidens* Germar, type-species of *Pityokteines* Fuchs, than does any other American species. It is, therefore, proposed that *ornatus* be transferred to *Pityokteines*.

Phloeosinus punctatus Leconte

Phloeosinus punctatus Leconte, 1876, Proc. Amer. Philos. Soc. 15:381 (Oregon; Mus. Comp. Zool.).

Phloeosinus buckhorni Blackman, 1942, Proc. U.S. Nat. Mus. 92:432 (Portland, Oregon; U.S. Nat. Mus.). *New synonymy*

Phloeosinus kaniksu Blackman, 1942, Proc. U.S. Nat. Mus. 92:434 (Metaline Falls, Washington; U.S. Nat. Mus.). *New synonymy*

Phloeosinus rusti Blackman, 1942, Proc. U.S. Nat. Mus. 92:435 (Metaline Falls, Washington; U.S. Nat. Mus.). *New synonymy*.

This is a common and somewhat variable species from California to British Columbia. Blackman described *buckhorni* and *kaniksu* on the basis of characters of the vestiture and of elytral sculpture, and depth of the male frontal excavation, that distinguished them from *punctatus* Leconte. The examination of several hundred specimens revealed that, while many specimens of this species have glabrous elytra, other specimens possess a moderate amount of elytral pubescence some of which is subsquamose in the female. When series were compared to Blackman's paratypes of both *buckhorni* and *kaniksu*, it is apparent that his names refer only to variants of the older name *punctatus*. Male and female paratypes of *rusti* Blackman also fall within the normal range of variation of *punctatus*. The minute characters on which *rusti* was based are not consistent,

even within the type series; therefore, *rusti* must be placed in synonymy under *punctatus*.

Pityophthorus schwerdtfergeri (Schedl), n. comb.

Conophthorus schwerdtfergeri Schedl, 1955, Zeitschr. Angew. Ent. 38:28 (Rancho near Quezaltenango, Guatemala; Schedl Collection).

Pityophthorus islasi Wood, 1962, Gt. Basin Nat. 22:80 (Temascaltepec, Mexico, Mexico; Wood Collection). *New synonymy*.

Conophthocranulus islasi Schedl, 1963, Ent. Arb. Mus. Frey. 14:163 (Temascaltepec, Mexico, Mexico; Schedl Collection). *New synonymy*.

The types of *schwerdtfergeri* Schedl, *islasi* Wood and *islasi* Schedl were all examined; Schedl's types were compared directly to one another and to paratypes of *islasi* Wood. All represent the same species; *islasi* Wood and *islasi* Schedl bear identical locality labels and undoubtedly came from the same original series. The species, although rather large, belongs to Blackman's group V in the genus *Pityophthorus* as is clearly indicated by the male frons, the antennae and other structures.

Poecilips advena Blandford

Coccotrypes advena Blandford, 1894, Trans. Ent. Soc. London, p. 100 (Nagasaki, Japan; British Mus. Nat. Hist.).

Poecilips sannio Schaufuss, 1897, Berliner Ent. Zeitschr. 42:110 (Gabun; location of type uncertain).

Dendrurgus philippinensis Eggers, 1923, Zool. Meded. 7:145 (Mt. Makiling, Luzon, Philippine Isl.; Schedl Collection). *New synonymy*.

Schedl (1963, Ent. Abh. Ber. Mus. Tierk. Dresden 28:266; 1964, Reichenbachia 2:217) treated several synonyms of this species under the name *sannio* Schaufuss. Recently the types of *Coccotrypes advena* Blandford and of *Dendrurgus philippinensis* Eggers were examined and compared to my specimens from the Philippine Islands, Japan, various Pacific islands, Africa and other areas. The type of *advena* and other Japanese specimens have the declivital interstrial bristles less strongly flattened than do most specimens from other areas; however, they are much more similar to specimens from various Pacific islands, the Philippine Islands, and Indonesia than they are two cotypes of *sannio* and most other African specimens. Most of the African material has the elytral bristles strongly flattened from the elytral base to the declivity and, in addition, those on the elytral declivity are short, scarcely more than half as long as comparable bristles on specimens from other areas. While it is quite evident that geographical races or subspecies may be recognizable, it appears best to treat *sannio* and *philippinensis* as synonyms of *advena* until adequate material is available from more areas in Africa.

Polygraphus rufipennis (Kirby)

Apate (*Lepisomus*) *rufipennis* Kirby, 1837, Fauna Boreali-Americana 4:193 (Lat. 65° in North America; British Mus. Nat. Hist.).

Polygraphus polygraphus: Schedl, 1957, Ann. Mag. Nat. Hist. (12)10:150 (*rufipennis* included as a synonym).

After examining numerous specimens of *rufipennis* Kirby from North America and *polygraphus* Linnaeus from Europe and Asia, Schedl concluded that the two were synonymous. In my examination of numerous specimens from Europe, eastern Russia, and numerous localities in Alaska, Canada and the United States, consistent differences in these forms were apparent that were not mentioned by Schedl. It is readily apparent that the two forms are very similar. However, when series from any European or Asiatic locality are compared to series from any North American locality, the latter have frontal, pronotal and elytral punctures that are consistently larger than punctures from comparable areas on the European or Asiatic material. Occasional specimens are difficult to separate, but most are not.

In the genus *Polygraphus*, specific differences often are minute, at times much more subtle than those refered to above. In view of this and the large distributional areas of both forms where variation within each form is minimal, it appears best to recognize both *polygraphus* and *rufipennis* as valid species.

Pseudothysanoes tresmariae (Schedl), n. comb.

Hylocurus tresmariae Schedl, 1956, Pan-Pacific Ent. 32:32 (Maria Madre, Tres Maria Isl., Mexico; California Acad. Sci.).

Specimens of *tresmariae* Schedl from the type series in the Schedl collection were examined recently and found to represent the genus *Pseudothysanoes*, and not *Hylocurus* as originally assigned.

Pteleobius mundulus (Broun)

Homarus mundulus Broun, 1881, Manual of the New Zealand Coleoptera 2:740 (New Zealand; British Mus. Nat. Hist.).

Acrantus opacus Broun, 1895, Ann. Mag. Nat. Hist. (6)15:417 (New Zealand; British Mus. Nat. Hist.). *New synonymy*

The holotypes of *mundulus* Broun and *opacus* Broun were compared directly to one another. The only apparent difference between the two is size. Since most of the specimens of this species I examined were intermediate in size between the two, although both large and small examples were also present, the two names are considered synonymous with *mundulus* having priority.

Hypothenemus (*Stephanoderes*) *rufescens* Hopkins

Stephanoderes rufescens Hopkins, 1915, U.S. Dept. Agr. Rept. 99:29 (Allegheny, Pennsylvania; U.S. Nat. Mus.).

Hypothenemus emarginatus Schedl, 1942, Tijdschr. Ent. 85:11 (Buitenzorg, Java; Schedl Collection). *New synonymy.*

Hopkins described *rufescens* from specimens collected from imported Brazil nuts, *Bertholletia excelsa*, although the host plant was not recorded in the original description. My specimens that were part

of the original series from which Hopkins' type was selected, were compared to specimens from the original series of *emarginatus* Schedl. Since then both types have been examined and the synonymy has been confirmed. The name *rufescens* has priority and should, therefore, be used to designate this species.

Scolytus tsugae (Swaine)

Eccoptogaster tsugae Swaine, 1917, Dom. Canada Dept. Agric. Ent. Br. Tech. Bull. 14(1):32 (Cherry Ck., Vernon District, B.C.; Canadian Nat. Coll.).

Eccoptogaster monticolae Swaine, 1917, Dom. Canada Dept. Agric. Ent. Br. Tech. Bull. 14(1):32 (Arrowhead, B.C.; Canadian Nat. Coll.). *New synonymy.*

The types of *tsugae* Swaine and *monticolae* Swaine differ slightly in the appearance of the surface of the abdominal sterna. This surface is dull in the former and shiny in the latter type. Because of the difficulty in obtaining adequate material from the type localities, and because of variability in the supposedly diagnostic character, the validity of the two forms has not been questioned. However, both types as well as series from both type localities have now been studied along with several other series from British Columbia. It now appears reasonably certain that only one species in this species complex exists in British Columbia and that *monticolae* should be placed in synonymy under *tsugae* because of page priority.

Scolytus unispinosus Leconte

Scolytus unispinosus Leconte, 1876, Proc. Amer. Philos. Soc. 15:372 (Oregon; Mus. Comp. Zool.)

Scolytus sobrinus Blackman, 1934, U.S. Dept. Agric. Tech. Bull. 431:23 (Kent, Washington; U.S. Nat. Mus.). *New synonymy.*

Several hundred specimens of this species, including Blackman's type series of *sobrinus*, have been examined. The charaters on which *sobrinus* was based are far less conspicuous than Blackman's key and description might suggest. It appears that the variation he described represents only a local population that intergrades with several other equally indistinct local populations from Oregon and Washington. In the absence of any biological or consistent anatomical characters to distinguish *sobrinus*, it should be placed in synonymy under the older name *unispinosus*.

Tricolus nodifer Blandford

Tricolus nodifer Blandford, 1905, Biol. Centr.-Amer., Coleopt. 4(6):287 (Mirandilla, Guatemala; British Mus. Nat. Hist.).

Tricolus triarmatus Schedl, 1939, Mitt. Münchner Ent. Ges. 29:578 (Colonia, Mexico; Schedl Collection). *New synonymy.*

The types of both *nodifer* Blandford and *triarmatus* Schedl were examined and were compared directly to my specimens from Teziutlan, Puebla, Mexico, with which they agree in all charaters. The name *triarmatus* should, therefore, be placed in synonymy under the older name *nodifer*.

Xyleborus capucinus Eichhoff

Xyleborus capucinus Eichhoff, 1868, Berliner Ent. Zeitschr. 12:281 (Guadeloupe; evidently in Chapuis Collection, Paris Mus.).

Dryocoetoides guatemalensis Hopkins, 1915, U.S. Dept. Agric. Rept. 99:52 (Livingston, Guatemala; U.S. Nat. Mus.). *New synonymy*

Xyleborus capicinoides Eggers, 1941, Arb. Morph. Tax. Ent. Berlin-Dahlem 8:104 (Guadeloupe; U.S. Nat. Mus.).

My female of *guatemalensis* Hopkins from Teziutlan, Puebla, Mexico, that was compared to the female holotype was also compared to Blandford's (1898 Biol. Centr.-Amer., Coleopt. 4[6]:203) four females he had compared to the type of *capucinus* Eichhoff. Since they are obviously identical, the type of *Xyleborus villosulus* Blandford (op. cit., p. 204) was examined to determine its status because Schedl (1952, Ent. Blätt. 47-48:161) had treated *guatemalensis* and *villosulus* as synonyms. The inflated and posteriorly tuberculate front tibiae and the characters of the elytral striae and vestiture of *capucinus* are entirely different from those of *villosulus*. Based on these studies, *guatemalensis* must be placed in synonymy under the older name *capucinus*, and *villosulus* is a distinctly different species.

Apparently all specimens of *capucinus* in the Schedl collection were included under the name *capucinoides* Eggers. Based on the comparison of my material with a cotype of *capucinoides*, Eggers species must also be treated as a synonym of *capucinus*.

Xyleborus coartatus Sampson

Xyleborus coartatus Sampson, 1921, Ann. Mag. Nat. Hist. (9)7:32 (Trinidad; British Mus. Nat. Hist.).

Xyleborus artecuneolus Schedl, 1939, Proc. Roy. Ent. Soc. London, 8:14 (Trinidad; British Mus. Nat. Hist.). *New synonymy.*

The female holotypes of *coartatus* Sampson and *artecuneolus* Schedl were compared directly to one another. Not only are the types identical, but they were both collected in Trinidad by F. W. Urich from cacao (*Theobroma*) in 1914. The name *artecuneolus* must be placed in synonymy under the older name *coartatus*.

Xyleborus intersetosus Blandford

Xyleborus intersetosus Blandford, 1898, Biol. Centr.-Amer., Colept. 4(6):211 (Tamahu, Vera Paz, Guatemala; British Mus. Nat. Hist.).

Xyleborus analogus Schedl, 1949, Rev. Brasileira Biol. 9:277 (Mexico; Schedl Collection). *New synonymy.*

The female holotypes of *intersetosus* Blandford and *analogus* Schedl were both compared directly to my female specimen from El Hato del Volcan, Chiriqui Prov., Panama, and were found to be identical. The older name *intersetosus* has priority over *analogus* and should be used to designate the species. It appears to be a relatively common species from Mexico to Panama.

Xyleborus obliquus Sharp

Xyleborus obliquus Sharp, 1885, Trans. Roy. Dublin Soc. (2)3:192 (Hawaii; British Mus. Nat. Hist.).

Xyleborus tantalus Schedl, 1941, Proc. Hawaiian Ent. Soc. 11:114 (Tantalus, Oahu; British Mus. Nat. Hist. and Schedl Collection). *New synonymy.*

Sharp's type of *obliquus* and several specimens collected with the type series of *tantalus* Schedl, including types and cotypes, were compared directly to one another. Although some variation is apparent it is clear that only one species is represented; consequently, *tantalus* must be placed in synonymy under the older name *obliquus.*

Xyleborus spinulosus Blandford

Xyleborus spinulosus Blandford, 1898, Biol. Centr.-Amer., Coleopt. 4(6):201 (San Gerónimo, Guatemala; British Mus. Nat. Hist.).

Xyleborus spinosulus Schedl, 1934, Stylops 3:178 (Hawaii; F. C. Hadden Collection?).

The cotypes of *spinosulus* in the Schedl collection and my series from Hawaii agree in size and all structural details with many of my specimens of this common species from Costa Rica. The larger type of *spinulosus* Schedl differs slightly from that of *spinosulus*, but is identical with many other specimens from Costa Rica. The principal differences between the two forms, as represented by the types, are body size and the relative sizes of three pair of spines on the elytral declivity. The length of the *spinulosus* form is about 2.4 mm. and the principal lateral spine near the middle of the declivity is larger, the two lateral sabapical spines are both relatively small. The length of the *spinosulus* form is about 2.0 mm. and the lateral pair of the two subapical spines is conspicuously larger than the other two. Within some series there is little deviation from these forms; however, in other series taken from the same tree branch both forms occur in any intermediate size and, in addition, other equally distinct forms exhibiting other size arrangements of the spines may be present. At times these new forms also occur in uniform series. Because of the variability of the forms, these long series clearly indicate that only one species is represented; therefore, *spinosulus* must be treated as a synonym of the older name *spinulosus.*

Xyleborus vulcanus Perkins

Xyleborus truncatus Sharp, 1885, Trans. Roy. Dublin Soc. (2)3:192 (Hawaii; British Mus. Nat. Hist.). *Preoccupied.*

Xyleborus vulcanus Perkins, 1900, Fauna Hawaiiensis 2:179 (Kilauea, Hawaii, Hawaiian Isl.; British Mus. Nat. Hist.).

Xyleborus adspersus Schedl, 1958, Tijdschr. Ent. 101:152 (new name for *truncatus* Sharp).

Xyleborus pacificus Nunberg, 1959, Beitr. Ent. 9:432 (new name for *truncatus* Sharp).

Several series of this species have been collected in which males and females were definitely associated together. Females of one of

these series were compared directly to Sharp's female type of *truncatus* and found to agree in all essential characters. The very different male is not represented in Sharp's material; however, it does agree in all details with the unique male holotype of *vulcanus* Perkins when compared directly. Because Sharp's name is preoccupied by *truncatus* Erichson (1836) the name *vulcanus* must be used. The more recent replacement names *adspersus* Schedl and *pacificus* Nunberg are junior synonyms.

Xylosandrus zimmermanni (Hopkins), n. comb.

Anisandrus zimmermanni Hopkins, 1915, U.S. Dept. Agric. Rept. 99:68 (Biscayne, Florida: U.S. Nat. Mus.).

Xyleborus biseriatus Schedl, 1963, Reichenbachia 1:226 (Nova Teutonia, Sta. Cat., Brazil: Schedl Collection). *New synonymy.*

Representatives of my series from Sebring, Florida, were compared directly to the holotype of *zimmermanni* Hopkins and were found to be identical in all respects. One of these female specimens was also compared directly to Schedl's type of *biseriatus* and was found to represent the same species. The name *biseriatus* must, therefore, be treated as a synonym of the older name *zimmermanni*. Allied species, including *biseriatus*, have correctly been placed in the genus *Xylosandrus*.

In addition to published records I have collected this species at the following localities: Tecolutla, Vera Cruz, Mexico; Rodeo and Volcan de Agua, Esquintla Prov., Guatemala; Zamorano, Honduras; and Pandora, Limon Prov., and Santa Ana, San José Prov., Costa Rica.

UNUSUAL RECORDS OF UTAH MITES

Dorald M. Allred[1]

During an ecological study of the reptiles of the Great Salt Lake Desert in 1953, thirty-five Desert Whipsnakes, six Great Basin Gopher Snakes, nine Great Basin Rattlesnakes, several Western Collard Lizards, and several Northern Brown-Shouldered Lizards were examined for parasites. The lizards were collected in Dugway Valley, and the whipsnakes, five gopher snakes, and four rattlesnakes from a den at the south end of Cedar Mountains. One gopher snake and five rattlesnakes were taken from the lower slopes of the desert mountains of Dugway Valley. All collections were in Tooele County.

The mites were mounted by Ernest J. Roscoe and determined and/or verified by Dr. James M. Brennan, Rocky Mountain Laboratory, Hamilton, Montana; Dr. Charles D. Radford, Nuffield Laboratory, Manchester, England; and Dr. Russell W. Strandtmann, Texas Technological College, Lubbock, Texas. Lack of keys and descriptions, and damaged or immature specimens prevented identification of some mites beyond family or genus.

In the following list the numbers of hosts infested and mites collected are indicated after their names.

Western Collared Lizard (*Crotaphytus collaris baileyi*) 1
Acomatacarus sp., 4 larvae
Northern Brown-Shouldered Lizard
(*Uta stanburiana stansburiana*) 1
Acomatacarus arizonensis, 4 larvae
Desert Whipsnake (*Coluber taeniatus taeniatus*) 9
Acomatacarus linsdalei, 3 larvae
Ellsworthia sp., 2 nymphs, 1 male
Ornithonyssus bacoti, 1 female
Trombicula arenicola, 25 larvae
Trombicula sp. (probably *arenicola*), 8 larvae
Acaridae, 2 hypopus nymphs
Analgesidae, 1 specimen
Dermoglyphidae, 51 females, 24 males
Great Basin Gopher Snake (*Pituophis catenifer deserticola*) 2
Acomatacarus linsdalei, 6 larvae
Trombicula arenicola, 1 larva
Trombicula sp. (probably *arenicola*), 4 larvae

All the mites were attached except the single *Ornithonyssus bacoti* taken from the hand of the collector after he handled a snake. The Analgesidae and Dermoglyphidae are typically feather mites, and their occurrence on snakes is most unusual. Each of eighteen female dermoglyphids contained one egg.

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NESTS AND PREY OF TWO SPECIES OF PHILANTHUS IN JACKSON HOLE, WYOMING (HYMENOPTERA, SPHECIDAE)

Howard E. Evans[1]

During the summer of 1964, I made a preliminary study of the ecology and nesting behavior of digger wasps occurring in restricted areas of sandy soil along the Snake River, in Jackson Hole, Wyoming. In some of these areas, many species nested in close proximity, for the most part exhibiting little or no interspecific aggression or competition for prey. A notable exception was provided by several species of *Philanthus*, which preyed upon various bees and wasps, many of which nested in these same sandy areas. The present report is concerned with two of these species, *P. pulcher* Dalla Torre and *P. zebratus nitens* Banks. Both of these forms are widely distributed in the western states, but neither has been studied previously. *P. pulcher* has often been regarded as a subspecies of the eastern *politus* Say, but I regard it as specifically distinct. On the other hand, *nitens* has generally been ranked as a full species, but G. R. Ferguson, who is currently revising *Philanthus*, informs me that he regards it as a subspecies of *zebratus* Cresson.

Philanthus pulcher Dalla Torre

This is a very common wasp in sandy places along the Snake River, appearing in late June or early July and remaining active into early August. The females nest in fine-grained sand or powdery sandy loam; in suitable spots nests may be separated by only 5-10 cm, and as many as 15-40 nests may occur per square meter. Males may often be observed in the nesting areas, either flying about irregularly or resting on low herbs and grass near active nests.

The digging of the nest is very similar to that of the closely related species *politus*, as described by Evans and Lin (1959). During and more especially following digging of the burrow, the mound of earth at the entrance is dispersed by a pattern of scraping movements similar to that of *politus*. One mound measured 4 X 6 X 1 cm prior to dispersal, approximately 8 X 12 X 0.1 cm following dispersal. The burrow enters the soil at an angle of 20-40° with the surface, but after a few cm dips down sharply, the major part of the burrow forming an angle of 50-70° with the surface. As is common in *Philanthus*, the terminus of the burrow is expanded slightly to form a storage place for prey; only after several prey have accumulated

1. Museum of Comparative Zoology, Cambridge, Mass. I wish to express my thanks to the director and staff of the Jackson Hole Biological Research Station, Moran, Wyoming, for providing a pleasant and effective base of operations for these studies; also to the authorities of Grand Teton National Park for permitting me to collect specimens for identification. I am indebted to P. H. Timberlake for identifying the bees and to R. M. Bohart and K. V. Krombein for assistance with some of the wasps.

here is a cell prepared to hold them permanently. The storage chamber is at a vertical depth of 4-8 cm (burrow length 8-10 cm). The cells are constructed from the ends of short burrows which are closed off as soon as the cell is provisioned. The 8 cells found in the three nests studied in detail varied in depth from 5 to 10 cm; the maximum number of cells found in one nest was five (Fig. 1).

Females often bring in prey very rapidly for short periods, then remain within the nest for a considerable time, presumably preparing a new cell, moving the prey to the cell, and laying the egg. The prey is carried in flight and held by the middle legs, as usual in this genus. The nest entrance is closed from the outside while the female is hunting and from the inside while she is inside the nest. From 8 to 14 prey are used per cell. The egg is laid longitudinally on the venter of one of the top prey, in the common *Philanthus* manner. I observed females hunting on the flowers of *Eriogonum* on several occasions. They appeared to approach the flowers from downwind and to strike at the prey in much the manner described by Tinbergen (1935) for *P. triangulum* Fabricius.

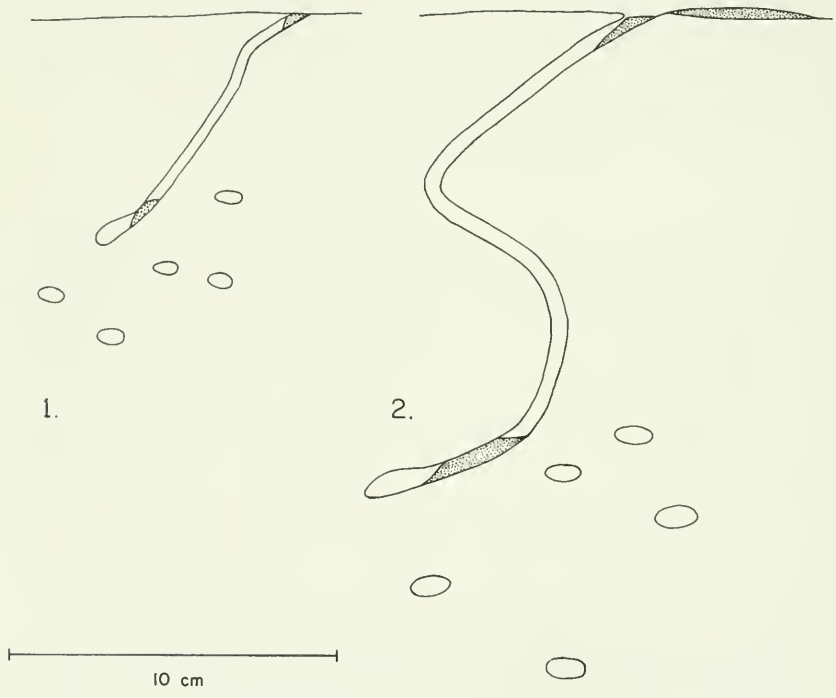

Figure 1. Nest of *Philanthus pulcher* Dalla Torre, note no. 1982, Moran, Wyo., July 11, 1964.

Figure 2. Nest of *P. zebratus nitens* Banks, note no. 2032, 5 mi. south of Elk, Wyo., Aug. 4, 1964.

In many cases *P. pulcher* females utilized as prey various wasps and bees which nested in close proximity to them, for example, small aphid predators of the genus *Xylocelia*, grasshopper predators of the genus *Tachysphex*, and female *Stenodynerus papagorum*, a vespid predator on caterpillars which is approximately as large as *Philanthus pulcher*. Probably these were captured on flowers, although it is possible that they were sometimes captured at the entrances of their nests. In all, I took 87 prey from *pulcher* nests; 50 were bees and 37 were wasps; 17 species of wasps were represented as compared to 20 species of bees. The complete list is as follows:

CHRYSIDIDAE (Cuckoo wasps)

Hedychridium fletcheri Bod. - 3 ♂ ♂
Holopyga ventralis Say - 1 ♀
Omalus aeneus Fabr. - 1 ♀

VESPIDAE (Mason wasps)

Ancistrocerus catskill albophaleratus Sauss. - 1 ♂
Stenodynerus papagorum Viereck - 1 ♀

SPHECIDAE (Digger wasps)

Belomicrus forbesi Robt. - 2 ♀ ♀, 2 ♂ ♂
Crabro florissantensis Rohwer - 1 ♂
Dienoplus pictifrons Fox - 1 ♀, 7 ♂ ♂
Ectemnius dives Lep. and Br. - 1 ♂
Mimumesa mixta Fox - 1 ♂
Passaloecus mandibularis Cress. - 1 ♀
Passaloecus sp. - 1 ♂
Tachysphex aethiops Cress. - 1 ♂
Tachysphex tarsatus Say - 7 ♂ ♂
Trypoxylon aldrichi Sand. - 1 ♂
Xylocelia gillettei Fox - 1 ♂
Xylocelia sp. - 1 ♀, 2 ♂ ♂

COLLETIDAE (Colletid bees)

Colletes nigrifrons Titus - 3 ♂ ♂
Hylaeus ellipticus Kirby - 1 ♀, 4 ♂ ♂

ANDRENIDAE (Andrenid bees)

Andrena melanochroa Ckll. - 1 ♀
Panurginus atriceps Cresson - 7 ♀ ♀, 3 ♂ ♂
Panurginus cressoniellus Ckll. - 3 ♂ ♂

HALICTIDAE (Sweat bees)

Dialictus (7 spp.) - 18 ♀ ♀
Halictus tripartitus Cresson - 3 ♀ ♀
Sphecodes sp. - 2 ♀ ♀

MEGACHILIDAE (Leaf-cutter bees)

Hoplitis clypeata Sladen - 1 ♀

Hoplitis producta Cresson - 1 ♂
Osmia sp. - 1 ♂
Stelis lateralis Cresson - 1 ♂

ANTHOPHORIDAE (Anthophorid bees)
Nomada spp. - 2 ♂ ♂

On several occasions I observed miltogrammine flies following females carrying prey. Several specimens were collected and found to be *Senotainia trilineata* (Wulp), a species known to parasitize other species of *Philanthus*, as well as many other digger wasps. I did not find fly maggots in any of the cells excavated.

Philanthus zebratus nitens (Banks)

This is a much larger species than *pulcher* and is quite unrelated to it, often being placed in a separate subgenus. I found only one nesting aggregation of this species, on a sandy road near the Snake River about 5 miles south of the Elk post office. About 20-30 females nested in coarse sandy loam in the center strip of an otherwise hard-packed road. No males were observed. I discovered this colony on August 4, and dug out only one nest. I returned on August 13 hoping to study the species further, but I could find none at all.

The entrances to the nests are conspicuous, since the burrow opening is large, 7-8 cm in diameter, and the soil at the entrance is not dispersed; the mound tends to be spread out fan-like in front of the hole, with one or more grooves leading from the entrance. The entrance is closed at all times when the female is away from the nest. The burrow is much deeper and more sinuous than in *pulcher*, but as in that species it terminates in a storage chamber. The cells are constructed from side-burrows from the lower part of the main burrow; they measure about 1 X 1.5 cm and are spaced 2-4 cm apart. There were five cells in the one nest excavated, these cells varying in depth from 15 to 20 cm (Fig. 2). The two cells farthest from the burrow (the deepest cell and the cell farthest right in figure 2) contained moldy prey and a wasp larva, respectively, and appear to have been the first two cells to have been constructed. One cell close to the burrow contained an egg laid longitudianlly on the venter of a bee; another contained a small wasp larva; and a third contained two fly maggots which had destroyed the cell contents. These maggots soon formed their puparia, and on May 15, 1965, two *Senotainia trilineata* (Wulp) emerged from these puparia. This same species of fly was observed following prey-laden females in the field. *Phrosinella pilosifrons* Allen was also observed digging at closed nest entrances.

A total of 26 prey were recovered from this nest or from provisioning females. Of these, 12 were wasps and 14 were bees. Some of these were relatively large; for example, the *Spilichneumon* and *Ammophila* exceed the *Philanthus* in length, and the *Megachile* and *Epeolus* are quite bulky. *Ammophila azteca* and probably

several of the other wasps and bees nested in the soil in the same area. The complete list is as follows:

ICHNEUMONIDAE (Ichneumon wasps)
Dusona sp. - 1 ♀
Spilichneumon spp. - 1 ♀, 3 ♂ ♂

VESPIDAE (Mason wasps)
Euodynerus castigatus Sauss. - 1 ♂
Stenodynerus taos Cresson - 1 ♀

SPHECIDAE (Digger wasps)
Ammophila azteca Cameron -2 ♀ ♀
Astata nubecula Cresson - 1 ♀
Palmodes carbo Boh. and Men. - 1 ♂

ANDRENIDAE (Andrenid bees)
Andrena cyanophila Ckll. - 2 ♀ ♀
Andrena eriogoni Ckll. - 1 ♀

HALICTIDAE (Sweat bees)
Lasioglossum trizonatum Cresson - 1 ♀
Nomia sp. - 1 ♂

MEGACHILIDAE (Leaf-cutter bees)
Hoplitis fulgida Cresson - 1 ♀
Megachile brevis Say - 1 ♂
Osmia tersula Ckll. - 5 ♀ ♀
Stelis monticola Cresson - 1 ♀

ANTHOPHORIDAE (Anthophorid bees)
Epeolus gabrielis Ckll. - 1 ♀

Discussion

The use of wasps as prey by species of *Philanthus* is not unusual, but the use of wasps in large numbers, including females of relatively large species nesting nearby, is of considerable interest. It is also worthy of note that both *P. pulcher* and *P. zebratus nitens* utilize parasitic bees, including genera such as *Sphecodes*, *Nomada*, *Epeolus*, and *Stelis*, which are rarely reported as prey of *Philanthus*.

It is also of interest to note that at least five species of *Philanthus* are able to nest together in Jackson Hole, thus paralleling the situation in the eastern states (Evans, 1964), although all five species are different. One of the five species in Jackson Hole, *bicinctus* (Mickel), has been studied in Yellowstone (Armitage, 1965), while another, *pacificus* Cresson, has been studied in California (Powell and Chemsak, 1959). I have studied the remaining species, *crabroniformis* Smith, only very briefly, and I shall hold on to my data in the hope of making a more complete study in the future. *Philanthus*

is one of the most rewarding genera of digger wasps for comparative studies, and it is to be hoped that studies from other areas will be forthcoming.

References

Armitage, K. 1965. Notes on the biology of *Philanthus bicinctus* (Hymenoptera: Sphecidae). Jour. Kansas Ent. Soc., 38:89-100.

Evans, H. E. 1964. Notes on the nesting behavior of *Philanthus lepidus* Cresson (Hymenoptera, Sphecidae). Psyche, 71:142-149.

Evans, H. E., and C. S. Lin. 1959. Biological observations on digger wasps of the genus *Philanthus* (Hymenoptera: Sphecidae). Wasmann Jour. Biol., 17: 115-132.

Powell, J. A. and J. A. Chemsak. 1959. Some biological observations on *Philanthus politus pacificus* Cresson (Hymenoptera: Sphecidae). Jour. Kansas Ent. Soc., 32:115-120.

Tinbergen, N. 1935 Über des Orientierung des Bienenwolfes. II. Die Bienejagd. Zeitschr. Verleich. Physiol., 21:699-717.

ADDITIONAL RECORDS FOR UNCOMMON BIRDS IN SOUTHERN NEVADA

George T. Austin and W. Glen Bradley[1]

The following sight records by Austin extend our knowledge of birds which are of uncommon occurrence in Clark County, Nevada. Specimens, where noted, are deposited in the Biology Museum, Nevada Southern University at Las Vegas.

Florida caerulea. Little Blue Heron.

Baldwin (1944:35) lists one record for Clark County, from Lake Mead on 13 November 1943. Austin, who is familiar with this species from field work in the southeast, has observed immature birds at Tule Springs on 9 May (with two Snowy Egrets) and 2 September 1964 and at Henderson Slough on 20 August 1964. All three birds showed dark primaries and the black-tipped, bluish bill.

Aythya marila. Greater Scaup.

One examined from a hunter's bag from the Virgin River near Riverside by Gullion (1952:204) on 4 November 1951 constitutes the only published record for Clark County. A drake was seen at close range along with several ring-necked ducks at Tule Springs on 20 March 1964.

Gallinula chloropus. Common Gallinule.

A sight record from the southern tip of the county on 27 January 1934 is the only published record for Clark County (Linsdale, 1936: 51). A specimen (B - 106) was collected at the Las Vegas Sewage Plant by Bradley on 13 May 1962. Sight records throughout the year by Austin from Henderson Slough, Twin Lakes (Las Vegas), and Tule Springs indicate that this species is an uncommon but regular resident in the Las Vegas Valley.

Mniotilta varia. Black-and white Warbler.

We have two additional records of this accidental visitant to southern Nevada; individual birds seen and heard at Corn Creek on 8 May 1965 and 23 May 1966. Four previous records from Clark County are from Boulder City (Monson 1950:256, Pulich and Gullion 1953:215).

Setophaga picta. Painted Redstart.

A sight record by Austin at the mouth of Eldorado Canyon on the Colorado River on 26 April 1963 is verified by a specimen from

1. Department of Biological Sciences, Nevada Southern University, Las Vegas, Nevada.

Hidden Forest, Sheep Mountains on 8 June 1963 and a sight record from the Clover Mountains in Lincoln County on 27 June 1963 (Johnson, 1965:114). These are the only records for Nevada.

Spiza americana. Dickcissel.

This species has been reported twice in Clark County by Pulich and Gullion (1953:215). Austin observed an adult male in his backyard in Las Vegas on 24 May 1964.

References Cited

Baldwin, G. C. 1944. Uncommon birds of the Boulder Dam area, Nevada. Condor 46:35.

Gullion, G. W. 1952. Recent bird records from southern Nevada. Condor 54:204.

Johnson, N. K. 1965. The breeding avifauna of the Sheep Spring Ranges in southern Nevada. Condor 67:93-124.

Linsdale, J. M. 1936. The birds of Nevada. Pacific Coast Avifauna 23:1-145.

Monson, G. 1950. The southwest region. Audubon Field Notes 4:255-257.

Pulich, W. M. and G. W. Gullion. 1953. Black-and-white Warbler. Dickcissel, and Tree Sparrow in Nevada. Condor 55:215.

NOTE

MAMMALS OF THE PAUNSAGUNT PLATEAU REGION, UTAH

Collecting and observation in the Paunsagunt Plateau, upper Sevier River valley of southern Utah, has disclosed some interesting and noteworthy mammal records. The data herein reported were obtained from October 1960 to July 1961 while the writer was park naturalist at Bryce Canyon National Park, Utah.

The Paunsagunt Plateau, located in south-central Utah in Garfield and Kane Counties, is oriented generally in a north-south direction and forms part of the divide between the Great Basin and Colorado River watersheds. Elevations range from approximately 7,500 to 9,200 feet. The upper Sevier River valley borders the Paunsagunt Plateau on the west and is bordered on the west by the Markagunt Plateau-Tushar Mountains uplands. The Sevier River flows northward for approximately 180 miles, thence west into the Great Basin.

In the vicinity of the Paunsagunt Plateau, the lower elevations support a mixed grass and sagebrush association which grades into piñon-juniper and/or ponderosa pine woodland in broken topography and at higher elevations. Ponderosa pine woodland is the dominant type over much of the Paunsagunt Plateau below elevations of 8,500 feet, above which it is replaced by white and douglas firs and spruce.

In the following species accounts, nomenclature follows that of Hall and Kelson (*Mammals of North America*, 2 vol. Ronald Press, New York, 1959). All measurements are given in millimeters.

Perognathus parvus. One specimen was collected April, 1961, 0.5 mile south of Highway 12, 4 miles west of Bryce Canyon National Park. Although it is within the range of the species, this is the first record of its occurrence on the Paunsagunt Plateau.

The specimen was taken in a snap trap in open, rolling rangeland supporting a low growth of black-sagebrush (*Artemesia nova*) and herbs. Elevation is ca. 7,800 feet. Pertinent data are: adult male; total length, 190; tail, 99; hind foot, 25. Specimen is in the Idaho State University collection. *Microtus montanus*. Durrant (*Mammals of Utah*, University of Kansas Publ. Mus. Nat. Hist., 6:1-549; 1952) includes this region within the range of *M. m. amosus* (Hall and Hayward). Specimens are recorded from the Boulder Mt., Aquarius Plateau area, Garfield County. Records for Kane County from "Steep Creek, Aquarius Plateau" are questionable, as the Aquarius Plateau does not extend into Kane County.

Two specimens of *M. montanus* were taken in a sedge swale, 0.25 mile south of Highway 12 near the Wilson Peak road. This is the first record for the species on the Paunsagunt Plateau. Vegetation of the collection site consists of a heavy growth of sedges and grass surrounded by open rangeland. Elevation is ca. 7,800 feet.

Our specimens are considerably smaller than measurements given by Durrant (*Ibid.*) for *M. m. amosus* and are near the minima for *M. m. nexus*., the latter subspecies occurring to the west of the Paunsagunt Plateau on the Markagunt Plateau. Pertinent data are as follows: male, with caudus epididimus distended, 155-34-20; female, non-gravid, 150-33-20 (no ear measurements). Specimens are in the Idaho State University collection.

Sylvilagus idahoensis (Merriam). Previous records for this species in southern Utah have all been from west of the highlands formed by the Markagunt Plateau-Tushar Mountains complex. Two specimens were taken and a number of individuals observed near Panguitch, Utah, in the upper Sevier River valley, June 1961. The collection site is situated on the alluvial fan between the western margin of the Sevier Plateau and the Sevier River valley, 3 miles northeast of Panguitch. Elevation is ca. 6,800 feet.

The animals were first observed along Limekiln Creek, an ephemeral stream which drains from the Sevier Plateau. The banks of this stream and many small tributary gullies are lined with big-sagebrush (*Artemesia tridentata*) with the

intervening areas being covered with a low growth of black-sagebrush. Burrowing seemed to be restricted to the former sites, although well-worn trails were conspicuous through the short black-sagebrush.

Investigation of several other localities south and west of Panguitch with similar vegetation failed to disclose additional colonies. Occurrence of the species in this area extends the range 30-40 air-line miles east across a highland area previously thought to be a barrier to them. However, this population may be disjunct as the species has not been reported elsewhere in the Sevier River valley, nor is there any indication that it occurs in the aforementiond highlands.

The specimens cited are in the Idaho State University museum. Pertinent data are as follows: adult male, total length, 265; ear, 52; foot, 65; adult female, 276-50-72; gravid with 5 10-mm. embryos (Stephen N. Stephenson, Department of Botany and Plant Pathology, Michigan State University, East Lansing, Michigan).

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NEW RECORDS AND SPECIES OF NEOTROPICAL PLATYPODIDAE (COLEOPTERA)[1]

Stephen L. Wood[2]

In order to make the names available for other work, 23 species of Platypodidae from Central America and British Guiana are described as new to science on the following pages. These species represent the genera *Tesserocerus* (1), *Cenocephalus* (1), *Neotrachyostus* (1), and *Platypus* (20). In addition to these new species, *Mecopelmus zeteki* Blackman is added to the family and a new tribe is designated for it; notes on its biology are also included. The known distribution of *Platypus longulus* Chapuis is extended, and the male of *Platypus otiosus* Schedl is described for the first time.

Mecopelmus zeteki Blackman

Mecopelmus zeteki Blackman, 1944, Proc. Ent. Soc. Washington 46:76-89.

When Blackman described the genus *Mecopelmus*, he discussed its affinities without assigning it definitely to a family group category. Additional material of this curious species is now available, as well as fragmental biological data on this and related genera, suggesting that *Mecopelmus* should be included in the Platypodidae and assigned to a new monobasic tribe, here designated as Mecopelmini, in the subfamily Coptonotinae.

On December 22, 1963, a long series of this species was collected from a cut woody vine (liana), *Serjania* sp., along a trail in secondary forest growth at Fort Clayton in the Panama Canal Zone. The beetles were strictly monogamous. Both adults and larvae mined the cambium region; there was no indication of fungal growth in more than 100 tunnels examined.

The host material was from about one-half to two centimeters in diameter. Entrance holes generally were in exposed areas; there was no consistent attempt by the beetles to conceal the entrance in a crevice, under a piece of bark, etc. When beetles were present in the tunnel, the entrance hole was blocked either by the brown frass

1. Part of the field work that led to the preparation of this article was made possible by a grant from the National Science Foundation, Number GB-532.

2. Department of Zoology and Entomology, Brigham Young University, Provo, Utah. Scolytoidea Contribution No. 29.

or by the posterior end of a beetle. The entrance tunnel extended through the thin bark to a simple, nuptial cavity that engraved the wood slightly. This irregular cavity varied from about 1-3 mm. (rarely as much as 5 mm.) in width and about 10 mm. (rarely as much as 23 mm.) in length. Its long axis was almost always parallel to the grain of the wood. As many as 40 eggs were scattered indiscriminately in the cavity. In a few tunnels one end of the cavity was filled by frass, but in these areas eggs were never present. Larvae were not present in the tunnels, except for a few in the first instar. Some old abandoned tunnels were available, however, that contained fully completed larval excavations in the cambium region. The larvae fed communally in the one or two irregular cavities extending with the grain of the wood from the parental chamber. These increased gradually in width to a maximum of about 5 mm. and rarely exceeded 20 mm. in length. Only one to three exit holes were observed from each larval tunnel.

Tesserocerus forceps, n. sp.
Figs. 1-2

Allied to *chapuisii* Schedl, but readily distinguished in the male by the gradually tapered process at the base of declivital interspace 1, not angled at apex, by having only two denticles between the process on declivital interspace 1 and the lateral terminal process, these at base of declivity on interspaces 3 and 5, by the longer, more slender lateral terminal processes, and by the divaricate sutural apex of the elytra, with the apical sutural angles extended (not divaricate and with these angles almost 90 degrees in *chapuisii*).

Male.—Length 7.3 mm., 2.6 times as long as wide; thorax and ventral areas yellowish-brown, head and posterior third of elytra moderately dark brown, the color gradually becoming lighter toward base of elytra.

Frons weakly convex above, irregularly flattened below, with a weak, median impression at lower level of eyes; surface rather dull, longitudinally substrigose, with rather fine, sparse, shallow punctures; vestiture sparse, inconspicuous.

Pronotum almost rectangular, very slightly wider posteriorly, 1.3 times as long as wide; surface almost smooth except where the scattered setae insert and in porous area on basal fifth.

Elytra 1.5 times as long as wide; striae distinctly impressed, the punctures small, sharply outlined, shallow; interspaces without regular punctures, but with irregularly placed, minute points, 2 widened basally, the minute points subasperate near base. Declivity oblique, moderately steep; base of declivity armed on interspace 1 by a large, tapered process diverging slightly from suture, its length from tip to its lateral base 70 percent of length of lateral terminal process; interspaces 2, 4, and 6 unarmed, 3 and 5 each with a small denticle, apex of 7 transversely cariniform and extending to base of lateral process; lateral terminal process long, rather slender, moderately converging, dorsal edge with one very small

tubercle about midway between carina of 7 and apex; sutural apex divaricate, the apical sutural angles moderately extended posteriorly; declivity face subshining, with four narrow longitudinal elevations evidently indicating positions of interstriae, the lateral impressed areas between them with large, obscure punctures indicated.

Female.—Length 7.0 mm.; similar to male except frontal impression absent; punctured area of pronotum covering basal third; base of elytral interspace 2 more coarsely asperate; sculpturing of elytral declivity similar, but all processes not more than half as large.

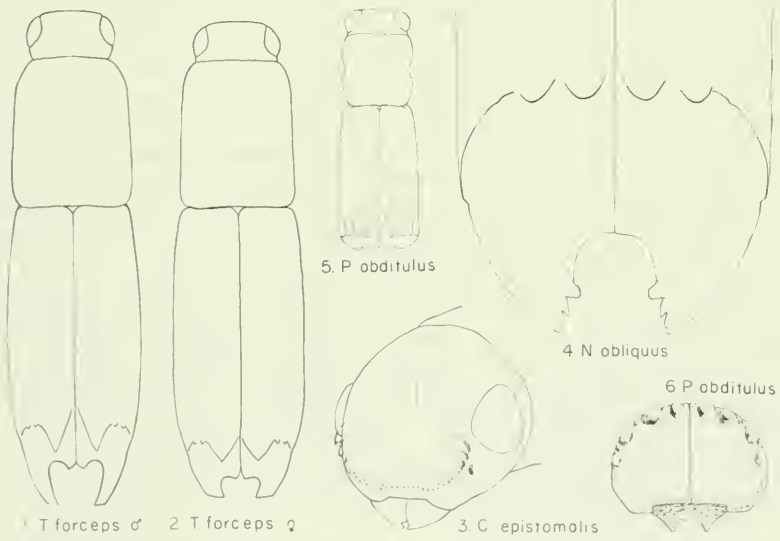
Type Locality.— Pandora, Limon Prov., Costa Rica.

Type Material.— The male holotype and female allotype were taken at the type locality on August 23, 1963, by S. L. Wood. They were taken in flight as they hovered above a large, unidentifiable log.

The holotype and allotype are in my collection.

Cenocephalus epistomalis, n. sp.
Fig. 3

This species evidently is more closely related to *pulchellus* Schedl than to other described species, but the relationship does not appear to be close. The female differs from *pulchellus* by the greatly reduced, specialized frontal setae that arise near the bases of the antennae, by the very unusual punctation of the epistomal



Figs. 1-6. 1, male, and 2, female of *Tesserocerus forceps;* 3, head of female *Cenocephalus epistomalis;* 4, dorsal aspect of male declivity of *Neotrachyostus obliquus;* 5, dorsal aspect and 6, caudal aspect of male *Platypus abditulus.*

region, and by the finer sculpture of the elytral disc and declivity. A male of *pulchellus* was not at hand for study.

Female.— Length 2.6 mm., 3.4 times as long as wide; color light brown, the head and declivity darker.

Frons broadly concave from eye to eye from just above epistoma to vertex, more strongly impressed medially from vertex to center of concavity; margin between epistoma and concavity appearing abrupt from eye to eye; the concavity reticulate and bearing above and below a few rather small setiferous punctures; epistomal area about equal to width of scape and extending from one antennal base to the other, flattened, very closely, rather deeply and finely punctured, the punctures decreasing in size toward concavity, arranged in about three confused ranks; frontal margin adjacent to antennal base bearing about 4-6 long, in-curved, hairlike setae, the two upper ones rather coarse (but less so than in *pulchellus*); vestiture very fine in concavity, coarser toward vertex, long and rather conspicuous but not abundant.

Pronotum 1.2 times as long as wide; sides of basal third parallel then expanded slightly to widest point just in front of middle, then narrowed slightly to anterior angles; anterior margin almost straight; surface reticulate, regularly punctured, the punctures small, round, rather deep; area of glandular pores entirely absent.

Elytra twice as long as wide; striae and interstriae indicated below the transparent surface layer, but on surface punctures scarcely impressed, the punctures appearing moderately large or small depending upon angle at which light reflects; base of interspace 3 with about 6 small, short, transverse crenulations. Declivity rather abrupt, very steep, broadly, moderately convex; striae strongly impressed from just before base to a point on declivity not more than one-fourth the distance from top, the punctures at most very obscurely indicated; interstriae moderately convex above, very finely granulate, 3 longer than others, extending almost to middle of declivity, 7 a little more coarsely serrate and continuing as lateral margin to outer apical angle (serrations much finer than in *pulchellus*); apical margin between obtuse lateral angles straight, much wider than in *pulchellus*, equal to slightly more than half (55 percent) the greatest width of elytra.

Male.— Length 2.5 mm.; similar to female except frons flattened and coarsely, irregularly punctured, pronotum more coarsely, deeply punctured, the punctures larger anteriorly; elytra more deeply, closely punctured, the punctures confused, except striae 1 indicated; and declivital sculpture coarser and with an acutely elevated subapical ridge extending from lateral angles about half the distance to suture.

Type Locality.— Mile 10 on the Bartica-Potaro road, British Guiana.

Host.— *Licania* sp.

Type Material.— The female holotype, male allotype, and 13 paratypes were taken at the type locality from the above host between October, 1948, and March, 1949, collection number 73, by

D. J. Atkinson. One paratype bears the same data except the host was *Pouteria* sp. and the collection number was 70. One male paratype is from Rio Damitas, San José Prov., Costa Rica, taken on February 18, 1964, at an elevation of 700 feet, from an unidentified log, by S. L. Wood.

The holotype, allotype, and most of the paratypes are in the British Museum (Natural History); some paratypes are in my collection.

Neotrachyostus obliquus, n. sp.

Fig. 4

Very similar to *putzeysii* Chapuis, but readily distinguished in the female by the broadly impressed frons, and by the absence of minute tubercles on the elytral declivity of the male.

Male.— Length 7.5 mm. (male paratype 7.2 mm.), 3.4 times as long as wide; color dark brown.

Frons transversely concave from eye to eye and from just above epistomal margin to vertex, with large, very shallow punctures from just above epistoma to level of middle of eyes; epistomal area slightly raised, reticulate and with about six setiferous punctures; lateral areas above antennal bases and also median area above middle of eyes with rather numerous, deep, setiferous punctures, the coarse, brown setae distinctly shorter than a distance equal to the width of the eye.

Pronotum 1.1 times as long as wide, widest at base, distinctly shallowly constricted about one-third its length from base; anteriorly, minutely strigose-reticulate, posteriorly with a few minute points; vestiture restricted to anterolateral angles.

Elytra 2.0 times as long as wide; sides straight, diverging very slightly to base of declivity, from dorsal profile lateral margins appearing serrate because of about a dozen equally spaced, posteriorly directed tubercles on interspace 9; elytral base with a sharply raised margin from suture to interspace 5; striae weakly impressed, both striae and interstriae on disc impunctate, smooth, shining, except near declivity striae become somewhat punctate-granulate and increase in width so as to eliminate interspaces 2, 4, and, in part, 6 and 8, some strial punctures visible on lateral interspaces. Declivity obliquely truncate; upper margin armed by a blunt spine on interspace 1 projecting posteriorly a distance less than its width, a similar projection on interspace 3 begins a continuous carinate crest extending to apex except for a notch at interspace 4, the crest lower and wider after reaching interspace 8; sutural apex with a deep U-shaped emargination formed by terminal processes, the apical half of the inner margin of this emargination bearing three rather large tubercles; declivital surface dull, subgranulose, with shallow punctures.

Female.— Length 6.8-7.2 mm., 3.6 times as long as wide; similar to male except frontal area from middle level of eye to epistoma smooth, impunctate; base of elytral interspace 2 roughened (not

asperate); serrations on interspace 9 reduced; declivity convex, steep, with a narrow groove just below lateral margin marking off declivital face, this area bearing about 14 rounded tubercles in two very indefinite rows in the apparent location of interspaces 1 and 2.

Type Locality.— Volcan, Puntarenas Prov., Costa Rica.

Host.— A tree known locally as "Huarumo."

Type Material.— The male holotype, female allotype, and one male and one female allotype, and one male and one female paratype were collected at the type locality on December 11, 1963, by S. L. Wood, from the bole, six inches in diameter, of the above host as named by local inhabitants.

All four specimens are in my collection.

Platypus abditulus, n. sp.

Figs. 5-6

This species is closely related to *abditus* Schedl (types compared directly), but is distinguished in the male by spine at base of interspace 1 being similar to spine on interspace 3 (not shorter and blunt as in *abditus*), by the presence of a smaller, but rounded spine, on interspace 7, and by the shallow, much wider apical emargination.

Male.— Length 3.4 mm. (paratypes 3.3-3.5 mm.), 3.4 times as long as wide; color light brown, the declivity darker.

Frons flattened, subrugosely, coarsely, shallowly punctate, more finely below bases of antennae. Antennal scape subtriangularly expanded and bearing a sparse fringe of hair on lower margin.

Pronotum 1.1 times as long as wide; sides constricted just behind middle, widest just behind constriction; surface dull, reticulate, with moderately abundant, small, shallow punctures; median line indicated on basal third.

Elytra 2.0 times as long as wide, sides straight, almost truncate behind; basal margin acutely raised to interspace 7, striae impressed on posterior two-thirds, the punctures very large, shallow, very obscure anteriorly, becoming more distinct posteriorly; interstriae becoming narrowly, continuously carinate on posterior two-thirds of disc; even numbered interspaces end just before declivital margin, odd numbered interspaces end in blunt processes, each process not longer than wide, all apparently of equal length as viewed from posterior aspect; elytral apex broadly, shallowly emarginate, the emargination more than four times as wide as deep (about twice as wide as deep in abditus); declivital face coarsely granulose, and with rather abundant, small, deep punctures.

Female.— Not represented.

Type Locality.— Near Moravia, Cartago Prov., Costa Rica.

Type Material.—The holotype and five paratypes were collected from the type locality on March 11, 1964, at an elevation of about 1,500 feet from an unidentifiable log.

All six specimens are in my collection.

Platypus exitialis, n. sp.
Fig. 7

This species is allied to *exitiosus* Schedl. but is distinguished by its larger size, by the more coarsely sculptured elytra and by the presence of three spines on the lateral terminal process (only two in *exitiosus*).

MALE.— Length 4.5 mm. (paratype 4.7 mm.), 3.2 times as long as wide; color dark brown.

Frons broadly planoconcave from vertex to the slightly elevated epistomal margin; surface coarsely sculptured with very large, moderately deep punctures, those below level of antennal bases somewhat smaller; vestiture consisting of a few inconspicuous, scattered setae on upper marginal areas.

Pronotum 1.1 times as long as wide; sides constricted just behind middle, widest at a point just behind this constriction; surface smooth and shining with rather numerous, fine, deep punctures and more abundant, minute, shallow punctures intermixed, a basal band of irregular, large, very shallow punctures at base.

Elytra 2.0 times as long as wide; base acutely elevated from suture to interspace 5; striae moderately impressed, particularly toward declivity, the punctures distinctly impressed; interspaces reticulose-strigose with irregular punctures and fine, sharp tubercles; the tubercles increasing in size and number toward declivity, 3 armed by about 6 broad transverse crenulations; interspaces 1 and 3 carinate on posterior two-thirds of disc, becoming serrate on posterior portion, 5 carinate on posterior half and 7 carinate almost to base, 1, 3, 5, and 7 each produced into a projecting spine, 3 longest, 1 very slightly longer than 5, 7 shortest, 8 and 9 posteriorly serrate. Declivital face almost circular, limited above by spines of interstriae 1 and 3 and laterally and below by three large, blunt spines of terminal lateral process; the first of these lateral spines in line with interspace 7, the second in line with interspace 9, the third is the apex of lateral process.

Femoral shield of metasternum and metepisternum formed by five rather large, posteriorly directed spines.

TYPE LOCALITY.— Bartica triangle, British Guiana.

HOST.— *Poweria engleri* (type) and *Licania* sp. (paratype).

TYPE MATERIAL.—The male holotype was collected from its host at the type locality between October, 1948, and March, 1949, by D. J. Atkinson. One male paratype was taken 10 miles from Bartica on the Potaro road in British Guiana from its host, during the above period of time.

The holotype is in the British Museum; the paratype is in my collection.

Platypus schedli, n. sp.
Fig. 8

This species is closely allied to *exitiosus* Schedl but is distinguished by its smaller size, by the confluent punctures on striae 1

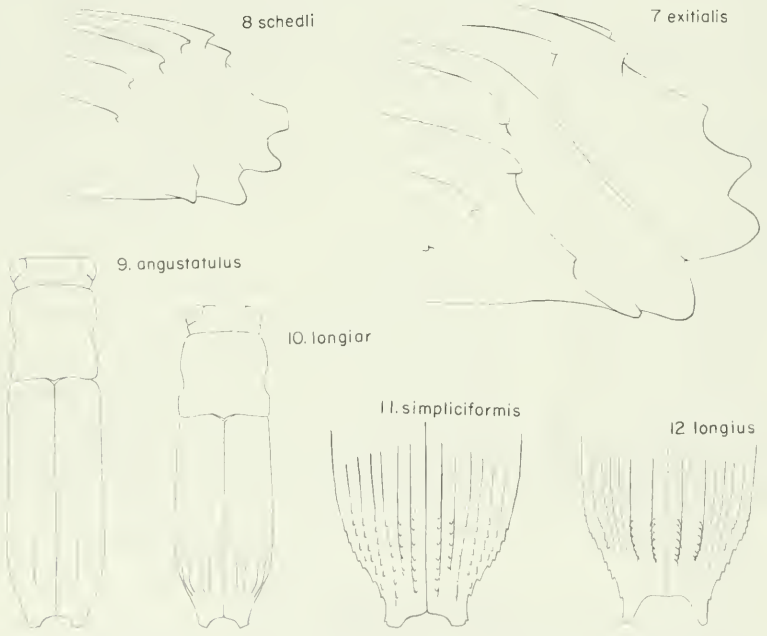
and 2, by the less strongly produced spines at base of declivity, and by the smaller, shallow, less numerous punctures on declivital face.

MALE.—Length 2.6 mm. (male paratypes 2.5-2.9 mm.), 3.0 times as long as wide; color light brown, the elytral declivity darker.

Frons very shallowly, coarsely rugose-punctate above level of antennal bases, rather coarsely, deeply, regularly punctured below; vestiture sparse. inconspicuous, restricted to area of vertex.

Pronotum subquadrate, almost as wide as long, feebly constricted just behind middle, very slightly wider near base; surface smooth and shining, with sparse, fine punctures and minute points, except base with a band of coarse shallow punctures from side to side and extending with finer punctures anteriorly along median line to a point about a third the length of the pronotum from base.

Elytra 1.7 times as long as wide, posteriorly tapered on apical third to the rather broad, 4-pronged apex; basal margin acutely elevated from suture to interspace 6; striae impressed, the punctures rather large and posteriorly on 1 and 2 confluent; interspaces with a few scattered punctures, 1-3 convex, 1 and to a lesser extent 3 carinate toward declivity, 2 and 4 eliminated before declivity; base of 3 armed by two broad transverse crenulations; interspaces 1, 3, and 5 armed by spines that project slightly behind (less than in



Figs. 7-12. *Platypus* spp. males: 7, *exitialis* declivity; 8, *schedli* declivity; 9. *angustatulus* dorsal aspect; 10, *longior* dorsal aspect; 11, *simpliciformis* dorsal aspect of declivity; 12, *longius* dorsal aspect of declivity.

exotiosus), almost equal in length. Declivity rather steep, shallowly sulcate near interspace 2, the surface granulose, the punctures rather small, shallow, moderately abundant; terminal process near suture, acute, and with an equally prominent lateral process that from above appears acute, from lateral view, quadrate; interspaces 6-9 unarmed.

Femoral shield on metasternum and metepisternum formed by three rather large, posteriorly directed teeth.

Female.— Length 2.9 mm. (paratypes 2.8-3.0 mm.), 3.2 times as long as wide; similar to male except elytral striae not impressed, the punctures small, feebly indicated, interstriae smooth and impunctate, except roughened near declivity; declivity convex, moderately steep, armed only by about a dozen rounded granules, and femoral shield with one small spine on metepisternum.

Type Locality.— Manaka, British Guiana.

Host.— *Eschweilera sagotianum.*

Type Material.—The male holotype, female allotype, and 49 paratypes were collected at the type locality from the above host between October, 1948, and March, 1949, by D. J. Atkinson, collection No. 17. Additional paratypes, all from British Guiana, taken in the same period from the same host by the same collector included: 7 from Moraballi (No. 29); 1 (No. 43) at light from mile 12, and 1 (No. 74) from mile 10 on the Batrica-Potaro road; 18 from Batrica triangle (1 extracted from *Catostemma* sp., 1 from *Eperua falcata*, the host not indicated for the others); 64 from the Ikuribisi (No. 46). One other male paratype in the Schedl collection is labeled Guyana Franciase, Passoura 9.

The holotype, allotype, and most of the paratypes are in the British Museum (Natural History). Other paratypes are in my collection and in the Schedl collection.

Platypus longulus Chapuis

Platypus longulus Chapuis, 1865, Monographie des Platypides, p. 158.

This species, previously known from Mexico and Guatemala, was collected in Costa Rica from Rio Damitas, San José Prov., August 14, 1963, and Gromaco Plantation on the Rio Coto Brus, Puntarenas Prov., July 22, 1963, by S. L. Wood. Additional specimens were also collected in British Guiana between January and March, 1949, by D. B. Fanshawe, at the Bartica triangle, from Kairobali, and between October, 1948, and March, 1949, by D. J. Atkinson, at mile 10 on the Bartica-Potaro road, from *Tapirira marchandii;* at Ikuribisi from *Eschweilera sagotianum;* and at Manawa from *Ocotea rodiaei.*

Platypus otiosus Schedl

Platypus otiosus Schedl, 1936. Arch. Inst. Biol. Veg. Rio de Janeiro 3:100.

A long series of this species was collected three miles west of El Salto, Durango, Mexico, from large *Quercus* logs. Both sexes were

present in many of the newly formed tunnels. A female of this series was compared directly to the unique female type of *otiosus*, both by K. E. Schedl and by myself, and found to be identical in all respects. Because the male previously was unknown, a brief description is presented below.

Male.— A representative of Chapuis' Platypi caudati; evidently more closely allied to *angustatus* Chapuis than to other known species, but declivity very different.

Length 5.2-5.7 mm. Frons very coarsely, closely, deeply punctured; lacking the transverse striation and the small excavations near antennal bases of female. Pronotum similar to that of female, except completely devoid of the very large, median pores. Elytra with striae and strial punctures more strongly impressed, the surface more nearly shining. Declivity with interspaces 1, 2, 4, 6, and 9 unarmed except by one or more fine tubercles; 3 with a large projecting process, its base extending almost half the distance down the declivity. 5 strongly elevated projecting only slightly, its base extending only slightly down declivity, 7 moderately elevated, sharply but not strongly produced, its base extending only slightly beyond declivital base, 8 bearing a moderately large, sharpened tubercle, its base at base of declivity as seen from above; apices of spines on interspaces 3, 5, 7, and 8 almost in a straight line. Lateral apical process longer and more slender than other species of this group, its apex ending in three acute spines.

Platypus occipitis, n. sp.

Allied to *occipitalis* Chapuis, but distinguished in the male by the subconcave frons, by the more coarsely punctured prothorax, by the subcarinate elytral interspaces on the disc, and by the more strongly elevated, posteriorly serrate interspace 9.

Male.— Length 4.1 mm. (paratypes 4.0-4.2 mm.), 2.8 times as long as wide; color light brown.

Frons flattened to vertex, with median half from level of middle of eye to epistoma shallowly concave; concave area reticulate and with rather large, circular punctures, upper area with large, shallow, partly confluent, reticulate punctures indicated; vestiture inconspicuous, short.

Pronotum as wide as long, sides rather deeply constricted at middle, a deep cavity formed at its posterior extremity in uppermost pleural region; surface subreticulate, with shallow, moderately large and small punctures intermixed.

Elytra about 1.6 times as long as wide (estimate, elytra spread); elytral striae rather strongly impressed, the punctures large, confluent, scarcely indicated; interspaces convex except at base, carinate on posterior half to declivital margin. Declivity convex; interspaces 1-9 equally subserrate, 9 very slightly more strongly elevated and continued to junction with 5, the low, acute ridge ascending slightly and continuing to 3 then descending abruptly to sutural apex (similar to *occipitalis* but all characters more strongly developed). Vesti-

ture largely restricted to declivity, consisting of short bristles almost equal in length to distance between rows of bristles.

Last visible abdominal sternum armed by a pair of large, blunt, cone-shaped processes.

Female.—Similar to male except the elytral interspaces convex, but not carinate, the declivity simple, and the abdominal spines absent.

Type Locality.— Ikuribisi, British Guiana.

Host.— *Pouteria guianensis.*

Type Material.—The male holotype, female allotype and 6 paratypes were taken at the type locality from the above host between October, 1948, and March, 1949, by D. J. Atkinson, collection No. 53. An additional female paratype, probably from this same series, is labeled "British Guiana, 1948-1949, D. J. Atkinson."

The holotype, allotype and some paratypes are in the British Museum (Natural History), other paratypes are in my collection.

Platypus angustatulus, n. sp.

Fig. 9

Allied to *mulsanti* Chapuis, but larger and more slender, the male is distinguished from that species by the less strongly elevated declivited interspaces, by the discontinuation of elevations on interspaces 3 and 5 on the declivital face, and by the more strongly elevated, more coarsely serrate, declivital interspace 9; the female frons more shallowly concave and more finely punctured.

Male.— Length 5.5 mm. (male paratype 5.7 mm.), almost four times as long as wide; color very dark brown, almost black.

Frons flattened from vertex to epistoma, the lower third weakly impressed in median area; surface with large, close, irregularly shaped, shallow punctures, appearing somewhat rugulose above, more finely sculptured below antennal bases, the epistoma almost smooth; vestiture short, inconspicuous.

Pronotum 1.2 times as long as wide, rather strongly constricted well behind middle; surface densely punctured, the punctures minute, shallow, irregular in shape, largely suppressed near anterior margin.

Elytra 2.6 times as long as wide; striae weakly if at all impressed, the punctures small, mostly elongate, rather strongly impressed; interspaces more than twice as wide as striae, obscurely subreticulate, with fine, scattered punctures; elytral bases acutely elevated from suture to interspace 5. Declivity not steep, convex to bases of terminal processes; interspace 1 feebly elevated and armed by 2-4 fine, setiferous tubercles above, reduced on lower half, 2 reduced throughout but bearing a few fine granules, 3 rather strongly raised on upper third, with about two small, setiferous tubercles on its summit, reduced below, 5 and 7 convex on upper third, each armed by about 3 setiferous tubercles, 8 elevated, the strong elevation continuing to apex of lateral apical process, its summit serrate;

terminal process short, blunt, rather broad. Vestiture confined to declivity, consisting of short, stout bristles, each bristle shorter than distance between rows of bristles, and several longer setae on apex of lateral processes.

TYPE LOCALITY.— Ten miles southeast of Cartago on the Pan-American Highway, Cartago Prov., Costa Rica.

TYPE MATERIAL.— The male holotype was collected at the type locality from an unknown log 14 inches in diameter on July 29, 1963, by S. L. Wood, at an elevation of 5,600 feet. One male paratype was taken from the same log on September 24, 1963.

Both specimens are in my collection.

Playtpus longior, n. sp.
Fig. 10

This species is more closely allied to *angustatulus* Wood (above) than to other known species, but is readily distinguished by the almost complete suppression of pronotal punctures, by the rather strongly elevated alternate interspaces on the elytral declivity, and by the narrower terminal elytral processes that are serrate only at their bases.

MALE.— Length 4.9 mm., 3.7 times as long as wide; color very dark brown.

Frons flattened, weakly impressed in median area below, rather coarsely punctured throughout, becoming rugose above level of antennal bases; vestiture sparse, inconspicuous.

Pronotum 1.2 times as long as wide; lateral constriction just behind middle, abrupt, rather short; surface subshining, minutely irregular, not clearly punctured although obscure, suppressed punctures evident; glandular pores not evident.

Elytra 1.3 times as long as wide; disc as in *angustatulus*. Declivity much as in *angustatulus* but with interspaces 1, 3, 5, and 7 rather strongly elevated, the elevations not descending abruptly behind except on 3, elevation on 3 also slightly more prominent than the others, 5 and 7 more distinctly serrate; 8 less strongly elevated than in *angustatulus*, finely serrate, the terminal lateral processes narrower. Vestiture confined to declivity, very slightly longer than in *angustatulus*.

FEMALE.— Length 5.0 mm., 3.7 times as long as wide; similar to male except pronotum subreticulate, with minute, shallow punctures, and with a pair of minute glandular pores one-third the length of pronotum from base (at anterior end of impressed median line); elytral declivity simple.

TYPE LOCALITY.— Ten miles southeast of Cartago on the Pan-American Highway, Cartago Prov., Costa Rica.

TYPE MATERIAL.— The male holotype and one female paratype were collected at the type locality on July 29, 1963, and the allotype at the same locality, on July 3, 1963, by S. L. Wood, from the same log that contained the type series of *angustatulus*.

All three specimens are in my collection.

Platypus simpliciformis, n. sp.
Fig. 11

This species is more closely allied to *coronatus* Schedl than to other known species, but it is not closely related. From *coronatus* it is readily distinguished by the much smaller size and, in the male, by the similar sculpturing of all declivital interspaces.

Male.— Length 5.0 mm., 3.3 times as long as wide; color dark brown.

Frons shallowly, broadly, transversely concave from epistoma to vertex; epistoma almost smooth and shining, becoming punctate-rugulose above level of antennal bases; vestiture fine, inconspicuous.

Pronotum 1.1 times as long as wide; the lateral constriction long, shallow; surface subreticulate, subshining, with fine, shallow, sparse punctures.

Elytra 2.1 times as long as wide; striae impressed, the punctures rather large, mostly confluent; interspaces twice as wide as striae, broadly convex toward base, narrowly rounded (almost costiform) at base of declivity, the punctures very minute, sparse, irregular. Declivity convex; striae deeply, abruptly impressed, the punctures largely suppressed except for transverse lines at bottoms of strial grooves; interstriae narrowly elevated, slightly narrower than striae, not higher than wide. 1-8 similarly sculptured, each with a sparse row of regularly spaced, posteriorly directed, fine, pointed tubercles, those on 8 and 9 larger, appearing serrate; all interspaces tend to converge toward, but end short of lateral terminal process; lateral process short, about as in *coronatus*, but with two very small dentations on lateral margin and one small tubercle near center of face; punctures of striae 1 distinct to near apex.

Type Locality.— Tapanti, Cartago Prov., Costa Rica.

Type Material.— The unique male holotype was collected at the type locality on October 24, 1963, by S. L. Wood, at an elevation of 4,000 feet, from a limb of *Phoebe mexicana* that was about 4 inches in diameter.

The type is in my collection.

Platypus longius, n. sp.
Fig. 12

This species is closely related to *longulus* Chapuis, but is distinguished in the male by the more strongly elevated interspace 3, by the suppression of the elevations on interspaces 1 and 3 on the lower declivity, by the more coarsely serrate interspaces 7 and 8, and by the longer terminal processes; the female differs from *longulus* by the presence of a pair of small glandular pores on the basal half of the pronotum, and frons bearing conspicuous tufts of hairlike setae.

Male.— Length 4.6 mm. (male paratypes 4.6-5.0 mm.), 3.5 times as long as wide; color very dark brown.

Frons flattened, median area slightly impressed below; surface finely, closely granulate; vestiture sparse, inconspicuous.

Pronotum 1.1 times as long as wide; lateral constriction abrupt, rather deep; surface dull, with numerous, close, fine punctures and minute pores; glandular pores absent.

Elytra 2.3 times as long as wide; disc as described above for *angustatulus*. Declivity convex; interspace 1 rather weakly, narrowly elevated on upper half and bearing several serrations, 2 reduced to a fine line on declivity, 3 more strongly elevated and serrate than 1, not at all elevated on lower half, 4-6 not elevated but subserrate, 7 moderately elevated and with about three rather coarse serrations, 8 rather strongly elevated and coarsely serrate to base of terminal process; terminal process long and slender, distinctly longer than its basal width, with one small spine on its upper apical extremity, and one or more fine serrations laterally.

Female.— Length 5.0 mm.; similar to male except frons with a pair of rather dense tufts of long hair, the area covered by each tuft extending ventromesad from inner angle of eye about two-thirds of distance to median line; pronotum with a pair of glandular pores two-fifths of pronotum length from base; and elytral striae not impressed, the declivity simple.

Type Locality.— Volcan Pacaya, Esquintla Prov., Guatemala.

Type Material.— The male holotype, female allotype, and five paratypes were collected at the type locality on June 1, 1964, by S. L. Wood, at an elevation of about 4,000 feet, from an unknown log. Two additional paratypes and two other males without head and prothorax were taken at Cerro Peña Blanca, Honduras, on April 23, 1964, by S. L. Wood. at an elevation of 6,000 feet, from a limb of *Quercus tomentocaulis*.

The type series is in my collection.

Platypus liraticus, n. sp.

Fig. 13

This species is closely related to *liratus* Blandford, but the male is readily distinguished by the more deeply impressed discal striae, with the punctures larger and regular, by the narrower, more strongly elevated, discal interstriae, by the more strongly developed lateral terminal elytral processes, and by the absence of tubercles on the lower third of declivital interspace 1.

Male.— Length 6.9 mm. (male paratype 6.5 mm.), 3.1 times as long as wide; color reddish-brown becoming darker posteriorly, the declivity almost black.

Frons very weakly, broadly concave from eye to eye and from epistoma to vertex; closely, shallowly, very coarsely punctured; vestiture sparse, inconspicuous.

Pronotum as wide as long; surface mostly reticulate with rather numerous, small and minute punctures intermixed; median line indicated on basal third.

Elytra 1.8 times as long as wide; disc as in *liratus* except striae more deeply impressed, the punctures on 1 and 2 larger, in definite rows, very close (almost contiguous), the interstriae narrower and more nearly carinate. Declivity similar to but more gradual than in *liratus*; interspace 1 elevated and narrowly convex on upper third, serrate (5 tubercles) on middle third, flattened and with a few punctures on lower third; 2 narrowed, with two fine tubercles near base, impressed below; 3 similar to 1 except lower third continues to lateral process; 4-8 narrowly convex to declivital base, each ending in a tubercle and followed by a series of two to four tubercles of equal size, ending just before lateral process; lateral terminal process much more prominent than in *liratus*, with a low, acute ridge extending from this process two-thirds of the distance toward sutural apex, the median marginal pair of tubercles below this ridge.

Type Locality.— Rio Damitas, San José Prov., Costa Rica.

Host.— *Rheedia edulis.*

Type Material.— The male holotype and one male allotype were taken at the type locality from the above host on February 18, 1964, at an elevation of 700 feet, by S. L. Wood.

Both specimens are in my collection.

Platypus chiriquensis, n. sp.

Fig. 14

This species is closely allied to *lafertei* Chapuis, but is readily distinguished by the much larger size and, in the male, by the subconcave frons, by the regular striae 1 and 2, by the sparsely punctured interspace 2, and by the much larger lateral spines on elytral apex.

Male.— Length 7.8 mm. (male paratypes 7.5-8.0 mm.), 3.1 times as long as wide; color black.

Frons moderately concave from eye to eye from epistoma to vertex; surface minutely rugose-reticulate and deeply, rather coarsely, closely punctured; vestiture inconspicuous.

Pronotum 1.1 times as long as wide; constriction moderately deep, short; surface dull, minutely, rather sparsely punctured, the punctures slightly larger at base and near anterior margin.

Elytra 2.1 times as long as wide; striae weakly impressed, the punctures small, regular, impressed; interspaces 1, 3, and 5 much wider, 2, 4, and 6 much narrower than normal, all with sparse, minute, irregularly placed punctures, 2-5 with a few pointed granules at base. Declivity gradual, its surface rugose-reticulate, dull; interspace 1 with four widely spaced, moderately large, pointed tubercles, 3 with two or three, 5 with one or two and 7, 8, and 9 with one or more similar tubercles, those near top of declivity tending to be larger; posterolateral angles only slightly produced beyond sutural apex, bearing on the outer apical angle two pair of spines arranged as in *lafertei* but much larger, two minute teeth between

Figs. 13-17. Dorsal aspect of *Platypus* males: 13, *liraticus* declivity; 14, *chiriquensis* declivity; 15, *brevicornis;* 16, *vegestus* declivity; 17, *eugestus* declivity.

median spine and suture; posterior margin adjacent to suture almost straight, not angled as in *lafertel.*

Female.— Length 8.0 mm., 3.5 times as long as wide; similar to male except lateral area of frons between antennal bases and middle level of eye rather strongly impressed, the impression on each side subcircular, abruptly margined laterally and above; pronotum surface satin smooth, with longitudinally etched, minute points, the median line indicated on basal third and with a patch of glandular pores on each side of its anterior end, each patch consisting of 8 or 9 rather small pores; striae impressed, the punctures small, obscure; elytral interspaces not noticeably unequal in width; declivity simple.

Type Locality.— Near Cerro Punta, Chiriqui Prov., Panama. (Labeled Volcan Chiriqui.)

Hosts.— *Ochroma* sp. (type), and *Inga* sp. (allotype).

Type Material.— The male holotype and three paratypes were taken from a balsa log (*Ochroma* sp.); the female allotype and three paratypes, from the base of a small *Inga* tree; and seven other paratypes, from unidentified logs and stumps. All were collected at the type locality on January 11, 1964, at an elevation of about 5,500 feet, by S. L. Wood.

The type series is in my collection.

Platypus brevicornis, n. sp.

Fig. 15

Although the relationship is remote, this species is more closely allied to *flavicornis* (Fabricius) than to other known species. The male resembles the female of *flavicornis* much more closely than it does the male. It differs from all others in this species group by the very short, abrupt declivity on which the elevated interspace 3 (as seen from above) extends to the posterior margin.

Male.— Length 5.1 mm., 3.9 times as long as wide; color moderately dark brown.

Frons flattened, with feeble impressions near center and on lower half; surface closely granulate, more nearly punctured toward epistoma; vestiture sparse, inconspicuous.

Pronotum 1.1 mm.; lateral constriction deep, abrupt; surface very finely, closely punctured, the numerous punctures irregular in size and shape; glandular pores absent.

Elytra 2.3 times as long as wide; striae weakly impressed at base, stronger toward declivity, the punctures moderately large, deep; interstriae about one and one-half times as wide as striae, surface very minutely, densely punctate and with a few widely spaced, fine punctures. Declivity short, subvertical, the general contour about as in female *flavicornis;* interspace 1 not elevated, bearing about four small, pointed tubercles at upper margin, 2 similar to 1 but with only one or two fine granules, 3 rather broadly, strongly elevated, apex of elevation projecting slightly and interrupting posterior profile of elytra (as seen from above), 4-9 convex, ending at declivital base but 4 and 6 shorter than others, 4-9 each with a fine granule just behind its apex, 9 elevated to apical process, its summit armed by about seven moderately coarse teeth; lateral apical process short, more slender but similar in length and perhaps sculpture to female *flavicornis*.

Abdominal segment 3 armed by a pair of widely spaced, large, conical spines; segment 4 bearing a pair of very small, similar spines.

Female.— Length 5.3 mm.; similar to male except frons somewhat more coarsely sculptured; declivity unarmed, interspace 3 wider and more strongly convex above; lower face of declivity vertical, bearing more than a dozen very small, rounded granules; costal margins of elytra near declivity finely serrate; abdominal segments unarmed.

Type Locality.— Villa Mills near Cerro de la Muerte, Costa Rica.

Host.— *Brunellia costaricensis*.

Type Material.— The male holotype, female allotype, and 21 paratypes were collected at the type locality on August 1, 1966, at an elevation of 10,000 feet, by S. L. Wood, from a log presumed to be the above host. One male paratype was taken at elevation 7,800 feet on the Pan-American Highway about 15 miles northwest

of Cerro de la Muerte, San José Prov., Costa Rica, on August 6, 1963, from a 24 inch log of the above host.

The holotype, allotype, and paratypes are in my collection.

Platypus annexus, n. sp.
Fig. 20

This species belongs to Schedl's Platypi complanati. It is not similar to any described species, but it is allied to the manuscript species *adnexus* in the Schedl collection. The male of this species differs from Schedl's, however, by the more sharply, deeply punctured frons, by the shorter declivital elevation on interspace 1, the elevation on interspace 3 longer, higher, and descending gradually behind, and by the shorter lateral apical angles of the elytra (not curved ventrad as much as in *adnexus*).

Male.— Length 3.0 mm. (male paratypes 2.8-3.1 mm.), 4.3 times as long as wide; color light brown.

Frons flattened from epistoma to vertex; surface smooth below level of antennal bases and somewhat coarsely, closely, deeply punctured, strongly reticulate and finely, regularly, but sparsely punctured above; vestiture sparse, inconspicuous.

Pronotum 1.3 times as long as wide; lateral, constriction deep, abrupt; surface substrigose-reticulate in anterior and posterior areas, shining in middle; median line indicated on basal third, with a pair of very large glandular pores near its anterial end, each pore one-fourth as wide as antennal club.

Elytra 2.6 times as long as wide; striae 1 weakly, others not at all impressed, the punctures small; interstriae smooth with numerous minute points, no regular punctures. Declivity broad, rather short, moderately steep; striae impressed near declivity above, not indicated below; interstriae 1-6 carinate at declivital base, 1, 3, and 5 elevated, 5 weakly elevated, 1 more strongly raised than 5, 3 more strongly, broadly elevated than 1, all descend gradually behind, 2 and 4 end before 1 and 5, 3 longer than others and extending almost to middle of declivity; truncate posteriorly (as seen from above), the lateral terminal processes extending scarcely beyond suture; interspace 8 elevated to lateral apical process, its summit armed by about four pointed tubercles; declivital face granulose-reticulate, with obscure, scattered punctures.

Female.— Similar to male except upper area of frons more coarsely punctured; pronotal glandular pores slightly larger; elytral declivity without elevations or impressed striae, the face abruptly declivous, subvertical; subtruncate behind, the lateral angles less prominent.

Type Locality.— Tapanti, Cartago Prov., Costa Rica.

Host.— *Quercus* sp.

Type Material.— The male holotype, female allotype and one male paratype were collected at the type locality from the above host on July 2, 1963, at an elevation of 4,000 feet, by S. L. Wood.

Two additional paratypes bear similar data except they were taken on October 24, 1963, from an unidentifiable log.

The type series is in my collection.

Platypus vegestus, n. sp.
Fig. 16

This species belongs to Schedl's Platypi complanati, but it is not closely related to any known species except *eugestus* Wood described below. From *eugustus* it is readily distinguished by the smaller size and by the narrow V-shaped notch at sutural apex of the elytra.

Male.— Length 3.3 mm. (male paratypes 3.0-3.4 mm.), 4.6 times as long as wide; color brown.

Frons flattened from epistoma to vertex, slightly impressed just above epistoma; surface dull, rugose-reticulate, rather coarsely, deeply punctured below, punctures smaller and shallow above; vestiture sparse, inconspicuous.

Pronotum 1.3 times as long as wide; lateral constriction very deep, abrupt; surface reticulate except in limited lateral areas, the punctures varying from fine to rather coarse, rather deeply impressed median line indicated on basal two-thirds, with a pair of large glandular pores near its middle, each pore about one-fifth as great as width of antennal club.

Elytra 2.8 times as long as wide; striae feebly impressed, the punctures moderately large, moderately impressed, elongate, on striae 1 partly confluent; interstriae about one and one-half times as wide as striae, with rather numerous minute points and no punctures. Declivity almost nonexistent, descending only slightly before apex; striae slightly impressed in declivital area, all striae and interstriae end before apex, declivital area rugose-reticulate, with a few minute, scattered tubercles in declivital area as remnants of interstriae, interspace 2 narrow, 3 rather wide, 8 raised and continued to lateral apical angle, summit of this crest bearing about five rather course serrations; sutural apex with a rather deep V-shaped notch, the notch slightly wider than deep and occupying about 30 percent of elytral width at apex, margin of notch marked by a small tubercle; lateral apical angle curved ventrad, extending only slightly beyond the truncated elytral apex.

Type Locality.— Elevation 7,800 feet on the Pan-American Highway about 15 miles northwest of Cerro de la Muerte, San José Prov., Costa Rica.

Host.— *Brunellia costaricensis.*

Type Material.— The male holotype and one male paratype were taken at the type locality from the above host on August 6, 1963, by S. L. Wood. Four additional male paratypes were taken 10 miles southeast of Cartago on the Pan-American Highway, Cartago Prov., Costa Rica, on October 24, 1963, at an elevation of 5,600 feet, from an unidentified log, by S. L. Wood.

The type series is in my collection.

Playtpus eugestus, n. sp.
Fig. 17

This species is allied to *vegestus* Wood, described above, but it is readily distinguished by its larger size, and by the broad U-shaped notch at the sutural apex of the elytra.

Male.— Length 4.2 mm. (male paratypes 4.2-4.4 mm.), 4.2 times as long as wide; color dark brown.

Frons flattened from eye to eye from epistoma to vertex, feebly, transversely concave below; surface reticulate below, rugose-reticulate above level of antennal bases, the punctures rather coarse and deep below, rather fine and shallow above; vestiture sparse, inconspicuous.

Pronotum 1.2 times as long as wide; lateral constriction deep, abrupt; surface very finely strigose-reticulate, with minute points and moderately abundant, small punctures; median line indicated on basal half, with a pair of moderately large glandular pores in usual position about one-third length of pronotum from base, each pore about one-sixth as great as width of antennal club.

Elytra 2.6 times as long as wide; striae weakly impressed on disc, more strongly near declivity, the punctures rather small, mostly impressed on basal half, obliterated toward declivity; interstriae about one and one-half times as wide as striae, with numerous minute points, regular punctures absent, basal parts of interspaces 1 and 2 reticulate. Declivity as described above for *vegestus* except the tubercles at ends of interspaces, at apical margin of sutural notch, and laterally on interspace 8 from declivital base to lateral apical angle distinctly larger, and apical sutural notch broadly U-shaped.

Female.— Length 4.4 mm.; similar to male except frons a little more deeply, uniformly punctured; elytral disc more nearly reticulate; strial punctures less distinctly impressed; and declivity short, steep, subvertical, simple, the face bearing scattered tubercles.

Type Locality.— Volcan Irazu, Cartago Prov., Costa Rica.

Hosts.— *Quercus* sp. (type), and *Brunellia costaricensis* (paratype).

Type Material.— The male holotype, female allotype, and three paratypes were taken at the type locality on July 13, 1963, at an elevation of 7,000 feet, from the bole of a large cut oak, by S. L. Wood. One paratype was taken near Cerro de la Muerte, San José Prov., Costa Rica, on August 6, 1963, at 7,800 feet, from *Brunellia costaricensis*. One other paratype was taken at Volcan Poas, Heredia Prov., Costa Rica, on July 14, 1963, from an unidentified, large log.

The type series is in my collection.

Platypus prenexus, n. sp.
Fig. 21

This species belongs to Schedl's Platypi complanati. It superficially resembles *annexus* Wood, described above, but probably represents a distinct subgroup. From *annexus* it differs by the absence of

glandular pores on the pronotum and, in the male, by the abruptly angled, vertical lower half of the elytral declivity, and by the lateral terminal processes of the elytra extending well beyond the apex of the elytral suture. The armature on abdominal sternum 3 suggests a relationship with *biporus* Blandford.

Male.— Length 3.4 mm. (male paratypes 3.4-3.7 mm.), 4.3 times as long as wide; color very dark brown.

Frons feebly convex above antennal bases, rather strongly, transversely impressed above epistoma; entire surface including punctures rugose-reticulate, with rather large, close, shallow punctures; vestiture sparse, inconspicuous.

Pronotum 1.2 times as long as wide; lateral constriction deep, abrupt; surface subshining, punctures small and minute intermixed, very abundant, close; glandular pores absent.

Elytra 2.3 times as long as wide; striae 1 moderately, others weakly impressed, the punctures, except near declivity, rather small, impressed; interstriae about one and one-half times as wide as striae, smooth, except for rather abundant very minute points; a moderately large, deep cavity at base of interspace 4 and median half of 5. Declivity rather gradually descending to middle then vertical on lower half; interspace 1 with a narrowly convex, elongate elevation on upper fourth, 2 reduced to a fine line, 3 broadly, strongly elevated to middle, projecting slightly so as to interrupt posterior profile, 4-7 moderately convex, ending before 3, 9 raised to lateral apical process and armed by a few very fine serrations; lateral processes as seen from above rather stout, extending slightly beyond suture; subvertical area of declivity rugose-reticulate, unadorned.

Abdominal sternum 2 armed by a pair of large, widely spaced, elongate, blunt spines; more closely spaced and more slender than in *biporus*.

Female.— Length 3.7 mm.; similar to male except epistomal impression not as strong; elytral disc more nearly reticulate; elytral declivity simple, unarmed; abdominal sternum 3 unarmed.

Type Locality.— Ten miles southeast of Cartago on the Pan-American Highway, Cartago Prov., Costa Rica.

Type Material.— The male holotype and 12 paratypes were collected at the type locality on October 24, 1963, at an elevation of 5,600 feet, from an unknown log, by S. L. Wood. The female allotype and nine paratypes were taken from the same log on July 29, 1963. One female paratype was taken at Volcan Poas, Heredia Prov., Costa Rica, on July 14, 1963, at 7,700 feet, from an unknown log, by S. L. Wood.

The type series is in my collection.

Platypus connexus, n. sp.

Fig. 18

This species is allied to *prenexus* Wood, described above, but is readily distinguished in the male by the much more strongly developed processes on the elytral declivity.

Male.— Length 4.0 mm., 4.3 times as long as wide; color dark brown.

Frons weakly convex, with a weak, transverse impression between level of antennal bases and epistomal margin; surface rugose-reticulate, with rather sparse, small, shallow punctures; vestiture sparse, inconspicuous.

Pronotum 1.4 times as long as wide; lateral constriction moderately deep, abrupt; surface subshining, minutely, closely punctured; glandular pores absent.

Elytra 2.6 times as long as wide; striae 1 moderately, others feebly impressed, the punctures small, impressed, not close; interstriae wider than striae; the surface with numerous, minute, scratched points, almost reticulate; interspace 4 with impressed cavity at base as in *prenexus*. Declivity abrupt, very steep; interspace 1 attaining margin, moderately, narrowly elevated then obliquely reduced behind, not projecting, 2, 4, 5, and 6 end short of margin, weakly if at all elevated, 3 projecting as a broad, blunt spine beyond sutural apex, almost equalling level of lateral terminal processes; interspaces 7 and 8 apically join one another and continue with 9 onto lateral process; outer margin of 9 with a few very fine serrations; lateral terminal process appearing subretangular from above, slightly longer than wide; the broad apical margin between bases of lateral processes almost straight, very slightly rounded behind as seen from above.

Third abdominal sternum armed by a pair of large, blunt spines as in *prenexus*.

Type Locality.— Elevation 7,000 feet, Volcan Irazu, Cartago Prov., Costa Rica.

Host.— *Quercus* sp.

Type Material.—The male holotype and one male paratype were collected at the type locality from the bole of a large cut oak tree on July 13, 1963, by S. L. Wood.

Both specimens are in my collection.

Platypus senexus, n. sp.

Fig. 19

This species is closely related to *connexsus* but is readily distinguished by the larger size, by the presence of a small spine at the apex of interspace 5, and by the slightly larger, projecting spines on interspace 1.

Male.— Length 4.7 mm., 4.0 times as long as wide; color very dark brown.

Frons weakly convex, with a weak, transverse impression between level of antennal bases and epistomal margin; surface rugose-reticulate, with rather sparse, small, shallow punctures; vestiture sparse, inconspicuous.

Pronotum 1.4 times as long as wide; lateral constriction moderately deep, abrupt; surface subshining, minutely, closely punctured; glandular pores absent.

Elytra 2.2 times as long as wide; striae 1 slightly, others feebly if at all impressed, the punctures small, impressed, not close; interstriae much wider than striae, the surface with interstrial points regular, obscurely impressed; interspace 4 with impressed cavity at base as in *prenexus*. Declivity abrupt, very steep; interspace 1 moderately, narrowly elevated, forming a projecting spine having its apex directed slightly mesad, 2 ends before declivity, 3 forming a large broad, projecting spine almost attaining length of lateral processes, its lateral margin tapered mesad, 4 ending in spine of 3, 5 with a moderately small, projecting spine about equal in size and length to that of 1, 6-9 ending in lateral process, 9 with a few fine serrations; lateral process as long as wide, appearing square from above, its inner apical angle (as seen from above) formed by the inwardly curved costal margin of process.

Third abdominal sternum armed by a pair of large spines, their spacing as wide as in *biporus*.

Type Locality.— Ten miles southeast of Cartago on the Pan-American Highway, Cartago Prov., Costa Rica.

Type Material.— The unique male holotype was collected at the type locality on July 29, 1963, at an elevation of 5,600 feet, by S. L. Wood, from the same unidentified log that contained *prenexus*. The holotype is in my collection.

Platypus clunalis, n. sp.
Fig. 22

The group to which this and the following two species belong evidently was not represented in either the British Museum or in

Figs. 18-24. Declivity of *Platypus* males: 18, *connexus;* 19, *senexus;* 20, *annexus;* 21, *prenexus*; 22, *clunalis;* 23, *clunis;* 24, *cluniculus*.

the Schedl collection. As a group these three species are unique in the relative simplicity of the dorsal structure and the remarkable development of the last abdominal sternum. The large process on this sternum at first appears to be the drooping apex of the abdomen, with its posterior face the last visible tergum.

Male.— Length 2.6 mm. (paratypes 2.6-2.8 mm.), 3.2 times as long as wide; color brown.

Frons shallowly, broadly concave from epistoma to vertex; surface reticulate, with moderately sparse, fine, shallow punctures; vestiture sparse, inconspicuous.

Pronotum 1.1 times as long as wide; lateral constriction neither deep nor abrupt; surface finely, uniformly reticulate, with fine, shallow, moderately abundant, obscure punctures.

Elytra twice as long as wide; basal margins acutely elevated from suture to interspace 6; entire surface reticulate; striae not at all impressed at base, their impression beginning just behind base and gradually increasing until strongly impressed at base of declivity, the punctures obsolete; interstriae narrower than striae, narrowly carinate at declivital margin, the carinae decreasing in height and acuteness anteriorly, extending on 1 and 2 to basal fourth, and on lateral interspaces to near middle of disc. Declivity short, abruptly rounded, the carinae decreasing the height and acuteness until lost near middle of declivity; lower declivital area subrugulose-reticulate, with a few fine, obscure granules and punctures indicated; interspace 9 near declivital base beaded by about five rounded granules; lateral angles rounded, not at all produced.

Last visible sternum with a very strong protrusion extending ventrad, its median sagittal measurement from junction with elytra to its apex a distance equal to 80 percent of the greatest width of the segment; its profile as seen from behind with sides convex and a pair of large, rounded tubercles at its peak; the process superficially resembling apex of abdomen.

Type Locality.— Near Moravia, Cartago Prov., Costa Rica.

Type Material.— The male holotype and six male paratypes were collected at the type locality on March 11, 1964, at an elevation of about 1,500 feet, from an unidentified log, by S. L. Wood.

The type series is in my collection.

Platypus clunis, n. sp

Fig. 23

This species is allied to *clunalis*, but is readily distinguished by its smaller size, by the acute posterolateral angles of the elytra, and by the basal constriction of the process of the last visible abdominal sternum.

Male.— Length 1.1 mm. (paratypes 1.1-1.2 mm.), about 3.5 times as long as wide; color brown.

Frons shallowly, broadly concave from epistoma to vertex; surface reticulate, with sparse, moderately large, shallow punctures; vestiture sparse, inconspicuous.

Pronotum 1.1 times as long as wide; lateral constriction neither deep nor abrupt; surface finely, uniformly reticulate, with fine, shallow, moderately abundant, obscure punctures.

Elytra almost twice as long as wide; basal margins acutely elevated from suture to interspace 6; entire surface reticulate; striae not at all impressed at base, their impression beginning just behind base and gradually increasing until strongly impressed at base of declivity, the punctures obsolete; interstriae narrower than striae, narrowly carinate at declivital margin, the carinae decreasing in height and acuteness anteriorly, extending on 1 and 2 to basal fourth, and on lateral interspaces to near middle of disc. Declivity short, abrupt, rounded, the interstrial carinae ending equally, somewhat abruptly, at upper margin; declivital face granulose; interspace 9 subserrate, ending in a short, acutely produced lateral process, an acutely elevated ridge continuing from its summit dorsomesad to a point in line with striae 5; lateral processes extend to a plane about midway between declivital base and apex of suture.

Last visible abdominal sternum basally constricted, proportionately as high but much narrower than *clunalis*; process armed at its summit by a pair of widely placed tubercles.

Female.— Similar to male except elytral striae not impressed, but with very minute punctures indicated, interspaces not carinate; declivity simple, pubescent, the setae short, abundant; last visible abdominal sternum neither protuberant nor armed.

Type Locality.— Playon, Puntarenas Prov., Costa Rica.

Host.— *Cedrela mexicana.*

Type Material.— The male holotype and one male paratype were collected at the type locality from the above host on August 9, 1963, at an elevation of about 150 feet, by S. L. Wood. The female allotype and one male paratype were taken at Rio Damitas, San José Prov., on August 22, 1963, at an elevation of 700 feet, from a limb of an unknown tree, by S. L. Wood.

The type series is in my collection.

Platypus cluniculus, n. sp.

Fig. 24

This species is rather closely related to *clunis* Wood, described above, but is distinguished by its smaller size, by the abrupt, vertical declivity, by the acute lateral apical angles not being visible from above, and by the more strongly constricted base of the process on the last visible abdominal sternum.

Male.— Length 1.9 mm. (male paratypes 1.8-1.9 mm.), 3.5 times as long as wide; color brown.

Frons very shallowly, broadly concave from epistoma to vertex; surface reticulate, with moderately sparse, fine, shallow punctures; vestiture sparse, inconspicuous.

Pronotum 1.1 times as long as wide; lateral constriction not deep, moderately abrupt; surface finely, uniformly reticulate, with fine, shallow, moderately abundant, obscure punctures.

Elytra twice as long as wide; basal margins acutely elevated from suture to interspace 6; entire surface reticulate; striae not at all impressed at base, their impression beginning just behind base and gradually increasing until rather strongly impressed at base of declivity, the punctures obsolete; interstriae narrower than striae, narrowly carinate at declivital margin, the carinae decreasing in height and acuteness anteriorly, extending on 1 and 2 to basal fourth, and on lateral interspaces to near middle of disc. Declivity abrupt, almost vertical, the interstrial carinae ending gradually just before the abrupt descent; declivital face granulose; interspace 9 subserrate, extending to the acutely pointed, posteroventrally directed, lateral apical angle, this angle not visible from above.

Armature of last visible abdominal sternum similar to that of *clunis* but more strongly constricted at its base on all sides, the process appearing more slender, the apical tubercles more closely placed.

Female.— Similar to male except elytral striae not impressed, but with very minute punctures indicated, interspaces not carinate; declivity simple, pubescent, the setae short, abundant; last visible abdominal sternum neither protuberant nor armed.

Type Locality.— Ikuribisi, British Guiana.

Host.— *Pouteria guianensis*.

Type Material.— The male holotype, female allotype and 26 paratypes were collected at the type locality from the above host between October, 1948, and March, 1949, collection No. 53, by D. J. Atkinson. Ten additional paratypes were taken at mile 10 on the Bartica-Potaro road, during the same period of time, by the same collector, from collection No. 70.

The holotype, allotype and most of the paratypes are in the British Museum (Natural History); other paratypes are in my collection.

NEW AND ADDITIONAL HOST-FLEA ASSOCIATIONS AND DISTRIBUTIONAL RECORDS OF FLEAS FROM UTAH

Harold J. Egoscue[1]

Flea collections made subsequent to publications by Stark (1958) and Parker and Howell (1959) include several noteworthy new host records and extensions of known ranges of fleas, mostly from western Utah. *Amphipsylla sibirica* ssp. and *Corrodopsylla curvata obtusata* (Wagner) are reported from the state for the first time.

Assistance of J. G. Bittmenn and J. A. Petrovich is gratefully acknowledged. H. E. Stark identified several specimens and confirmed some of my determinations. Flea nomenclature follows that of Stark (*op. cit.*) except in the genus *Monopsyllus* as revised by Johnson (1961). Mammal names, with one or two exceptions, follow Hall and Kelson (1959). Fleas are listed alphabetically. Specimens referred to are in the Ecology and Epizoology Reference Collections. The work was accomplished, in part, through a U. S. Army Research and Development contract with the University of Utah, and reported as Ecology and Epizoology Contribution No. 130.

Sorex vagrans obscurus Merriam

Monopsyllus wagneri (Baker). Tooele Co.: South Willow Creek Canyon, Stansbury Mts., 7,000 ft.; 7 Oct., 1965. 1♂.

Normally shrews are infested with fleas that are fairly host-specific, such as *Corrodopsylla curvata*. This is the only flea I have found on approximately 50 vagrant shrews collected in Utah.

Sorex palustris navigator (Baird)

1. *Catallagia decipiens* Rothschild. Tooele Co.: South Willow Creek Canyon, Stansbury Mts., 6,800 ft.; 7 Oct. 1965, 1♂. 2. *Corrodopsylla curvata obtusata* (Wagner). Tooele Co.: Middle Canyon, Oquirrh Mts., 7,100 ft.; 26 Aug. 1965, 1♂, 1♀. 3. *Hystrichopsylla dippiei truncata* Holland. Tooele Co.: Ophir Creek, Oquirrh Mts., 7,000 ft.; 1 Sept. 1966, 1♂. 4. *Megabothris abantis* (Rothschild). *Idem.*: 31 Aug. 1966, 1♂. 1 Sept. 1966, 1♀. 5. *Peromyscopsylla selenis* (Rothschild). *Idem.* : 31 Aug. 1966, 1♂.

Stark (1958) listed *C. c. curvata* from *Sorex* sp.; Bear Lake, Rich Co. All fleas recovered from water shrews, except *C. c. obtusata*, represent strays from *Peromyscus maniculatus* and *Microtus longicaudus*, both of which are commonly associated with water shrews.

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Perognathus longimembris gulosus Hall

Meringis parkeri Jordan. Tooele Co.: N base Little Granite Mt., 4,700 ft.; 24 Oct. 1962, 1 ♀.

Stark (*op. cit.*) and Parker and Howell (*op. cit.*) listed no records from little pocket mice. *Dipodomys ordii* and *D. microps* are the normal hosts of *M. parkeri* in western Utah.

Perognathus parvus olivaceus Merriam

Meringis hubbardi Kohls. Tooele Co.: Indian Springs, W side Simpson Mt., 6,500 ft.; 13 May 1964, 1 ♂, 2 ♀. Lookout Pass, S end Onaqui Mts., 6,300 ft.; 29 Apr. - 19 May 1965, 6 ♂, 19 ♀. South Willow Creek Canyon, Stansbury Mts., 25 June 1965, 1 ♂, 2 ♀. Box Elder Co.: Birch Creek Canyon, Vipont Mts., 7,500 ft.; 30 June 1963, 3 ♀.

In western Utah, the range of *M. hubbardi* appears to coincide very closely with the distribution of its principal host, the Great Basin pocket mouse. In my experience, it is found only as a stray on other small mammals associated with this pocket mouse.

Perognathus formosus incolatus Hall

Meringis dipodomys Kohls. Tooele Co.: Little Granite Mt., 4,800 ft.; 6 Nov. 1963, 1 ♂.

This species of flea is normally found on kangaroo rats. Fleas are not common on long-tailed pocket mice in western Utah.

Microdipodops megacephalus leucotis Hall and Durrant

Meringis parkeri Jordan. Tooele Co.: N base little Granite Mt., 4,700 ft.; 5 Sept. 1962, 1 ♀; Oct. 1962, 2 ♀.

These were the only fleas recorded from more than 200 dark kangaroo mice collected over a period of several years in western Utah.

Reithrodontomys megalotis megalotis (Baird)

Rhadinopsylla sectilis (J. & R.). Tooele Co.: Indian Springs, W side Simpson Mt., 6,500 ft.; 22 Apr. 1965, 1 ♀.

The western harvest mouse may not be one of the normal hosts of this flea. It was collected more frequently from deer mice than from other small mammals in Tooele County.

Peromyscus maniculatus sonoriensis (Le Conte)

1. *Catallagia decipiens* Rothschild. Tooele Co.: Indian Springs, W side Simpson Mt., 6,500 ft.; 12-14 May 1964, 2 ♂, 4 ♀. *Idem.*: 22 Apr. 1965, 1 ♀. South Willow Creek Canyon, Stansbury Mts., 6,800 ft.; 7 Oct. 1965, 1 ♂. Box Elder Co.: Birch Creek Canyon, Vipont Mts., 7,100 ft.; 30 June 1963, 1 ♀. Millard Co.: Swasey Springs, House Range, 6,900 ft.; 19 July 1964, 1 ♂. 2. *Hystrichop-*

sylla linsdalei Holland. Tooele Co.: Indian Springs, W side Simpson Mt., 6,500 ft; 23 Apr. 1965, 1♂. Beaver Co.: E base Indian Peak, 6,900 ft.; 16 Sept. 1963, 2♂, 2♀. 3. *Malaraeus euphorbi* (Rothschild). Tooele Co.: Indian Springs, W side Simpson Mt., 6,500 ft.; 22 Apr. 1965, 1♀. 4. *Meringis hubbardi* Kohls. Tooele Co. Indian Springs, W side Simpson Mt., 6,500 ft.; 12 May 1964, 1♀. Lookout Pass S end Onaqui Mts., 6,300 ft.; 19 May 1965, 1♀. Box Elder Co.: Birch Creek Canyon, Vipont Mts., 7,500 ft.; 30 June 1963, 2♀. 5. *Rhadinopsylla sectilis* (J. & R.). Tooele Co.: Indian Springs, W side Simpson Mt.; 12 May 1964, 2♀. Apr. 1965, 1♂, 1♀.

So many different species of fleas are found commonly on deer mice, it sometimes becomes difficult to decide which are strays. With the exception of *R. sectilis*, none of the above species have been found on deer mice collected in desert situations. I have collected as many as 7 species of fleas from a single deer mouse.

Clethrionomys gapperi uintaensis Doutt

Megabothris abantis (Rothschild). Uintah Co.: North Fork of Ashley Creek, Uintah Mts., 10,160 ft.; 26 Aug. 1962, 1♂.

Microtus longicaudus latus Hall

1. *Catallagia decipiens* Rothschild. Tooele Co.: South Willow Creek Canyon, Stansbury Mts., 6,800 ft.; 25 June 1965, 3♂, 2♀; 7 Oct. 1965, 1♂. 2. *Epitedia stanfordi* Traub. *Idem*: 7 Oct. 1965, 1♂. 3. *Hystrichopsylla dippiei truncata* Holland. Tooele County.: Middle Canyon, Oquirrh Mts., 7,100 ft.; 25-26 Aug. 1965, 1♂, 1♀. South Willow Creek Canyon, Stansbury Mts., 6,800 ft.; 25 June 1965, 1♀. 4. *H. linsdalei* Holland. Beaver Co.: E base Indian Peak, Needles Range, 6,900 ft.; 16 Sept. 1963, 3♀. 5 *Malaraeus telchinum* (Rothschild). *Idem*: 16 Sept. 1963, 5♂, 15♀. 6. *Megabothris abantis* (Rothschild). Tooele Co.: Middle Canyon, Oquirrh Mts., 7,100 ft.; 25-26 Aug. 1965, 3♀. 7.*Meringis hubbardi* Kohls. Tooele Co.: South Willow Creek Canyon, Stansbury Mts., 6,800 ft.; 25 June 1965, 1♀. 8. *Monopsyllus eumolpi* (Rothschild). *Idem*: 25 June 1965, 1♂. 9. *M. wagneri* (Baker). Tooele Co.: Indian Springs, W side Simpson Mt., 6,250 ft.; 23 Apr. 1965, 3♀. South Willow Creek Canyon, Stansbury Mts.; 25 June 1965, 3♂, 5♀. Middle Canyon, Oquirrh Mts., 7,100 ft.; 26 Aug. 1965, 1♀. 10. *Peromyscopsylla selenis* (Rothschild). Tooele Co.: South Willow Creek Canyon, Stansbury Mt.; 25 June 1965, 2♂, 4♀; 6,800 ft.; 7 Oct. 1965, 5♀. Vernon Creek, Sheeprock Mts., 6,500 ft.; 24 July 1964, 1♀. Middle Canyon, Oquirrh Mts., 7,100 ft.; 25-26 Aug. 1965, 3♀.

P. selenis in combination with *H. d. truncata* and *C. decipiens* were the principal fleas infesting long-tailed voles in the higher mountains of the Bonneville Basin. These were replaced on long-tailed voles in the drier areas by *M. telchinum* and *H. linsdalei*. To date,

these two species of *Hystrichopsylla* have not been found together at any western Utah locality.

Microtus pennsylvanicus pullatus Anderson

Hystrichopsylla linsdalei Holland. Tooele Co.: 3 mi. N Mills Junction, Tooele Valley, 4,225 ft.; 4 Feb. 1962, 1 ♀.

Microtus richarsoni myllodontus Rasmussen & Chamberlain.

Megabothris abantis (Rothschild). Uintah Co.: North Fork of Ashley Creek, 1.2 mi. E of Hacking Lake, Uintah Mts., 10,160 ft.; 26 Aug. 1962, 3 ♂.

Lagurus curtatus intermedius (Taylor)

1. *Amphipsylla sibirica* ssp. Tooele Co.: Indian Springs, W side Simpson Mt., 6,500 ft.; 13 May 1964, 1 ♀. Lookout Pass, S end Onaqui Mts., 6,250 ft.; 20 Apr. 1965, 2 ♀. E side Lookout Pass, S end Onaqui Mts., 5,600 ft.; 4 May 1966, 1 ♂. 2. *Malaraeus telchinum* (Rothschild). Tooele Co.: Lookout Pass, S end Onaqui Mts., 6,250 ft.; 18 May 1965, 1 ♀. 3. *Meringis hubbardi* Kohls. *Idem*.: 6,300 ft.; 18 May 1965, 1 ♀.

These are the first published records of fleas from sagebrush voles from Utah, and the first time the genus *Amphypsylla* has been recorded in the state. The specimens very closely resemble the published description of *A. s. washingtona* Hubbard (1954) described from material collected on sagebrush voles in eastern Washington. At Indian Springs, *Lagurus* were collected in a canyon bottom, along a small permanent stream where the principal plants were big sagebrush, *Artemesia tridentata*, and big rabbitbrush. *Chrysothomnus nauseosus*. Localities on Lookout Pass were more xeric in aspect, and the soil was shallower and boulder-strewn.

Zapus princeps utahensis Hall

1. *Catallagia decipiens* Rothschild. Tooele Co.: Middle Canyon, Oquirrh Mts., 7,100 ft.; 26 Aug. 1965, 2 ♀. 2. *Megabothris abantis* (Rothschild). *Idem*: 26 Aug. 1965. 3 ♂, 6 ♀. 3. *Monopsyllus ciliatus kincaidi* Hubbard. *Idem*: 26 Aug. 1965. 1 ♂.

These are the first fleas recorded from the western jumping mouse from western Utah. The occurrence of *M. c. kincaidi* in the Oquirrh Mountains is interesting in that it places this flea in a locality outside the range of one of its normal hosts, *Tamiasciurus* (Stark, 1958; Hubbard, 1947). However, at least 2 species of chipmunks occur in the Oquirrh Mountains, both of which are recorded as frequent hosts of *M. c. kincaidi* from places where chickarees and chipmunks occur together (Stark, *op. cit.*).

Mustela erminea muricas (Bangs)

Monopsyllus wagneri (Baker). Tooele Co.: South Willow Creek Canyon, Stansbury Mts., 7,500 ft.; 27 Sept. 1966, 5 ♂, 2 ♀.

Ermines and other weasels are regularly infested with fleas from their prey, a large percentage of which consists of rodents.

Literature Cited

Hall, E. R., and K. R. Kelson. 1959. The mammals of North America. 2 vols. The Ronald Press, New York. 1083 pp.

Hubbard, C. A. 1947. Fleas of western North America. The Iowa State College Press, Ames. 533 pp.

———. 1954. My last new North American fleas. Ent. News. 65:169-175.

Johnson, P. T. 1961. A revision of the species of *Monopsyllus* Kolenati in North America (Siphonaptera, Ceratophyllidae). Tech. Bull. No. 1227, Agri. Res. Service. U.S.D.A., Washington, D. C. 69 pp.

Parker, D. D., and J. F. Howell. 1959. Host-flea relationships in the Great Salt Lake Desert. Jour. Parasit., 45:597-604.

Stark, H. E. 1958. The Siphonaptera of Utah. U. S. Dept. Health, Education and Welfare. Communicable Disease Center, Atlanta, Ga. 239 pp.

SIPHONAPTERA (FLEAS) OF MESA VERDE NATIONAL PARK, MONTEZUMA, COLORADO

D Elden Beck[1]

Mr. Charles L. Douglas[2] submitted a collection of parasitic arthropods to me for determination in 1963, when he held the position of biologist for the Wetherill Mesa Archeological Project.[3] This report refers to the Siphonaptera collected from smaller mammals he trapped as a part of a larger study he was conducting in cooperation with the National Park Service at Mesa Verde National Park. An examination of the flea fauna proved to be very interesting, and Mr. Douglas has granted me the privilege of publishing the list of fleas, including comments on occurrence and distribution.

Collections were made between elevations of approximately 6,800 and 8,000 feet above sea level at several geographic locations. The predominant plant cover at Mesa Verde National Park is pinyon-juniper woodland.

Fourteen species of fleas were collected. The host animals were the deer mouse, *Peromyscus maniculatus*, the pinyon mouse, *Peromyscus truei*, and the Colorado chipmunk, *Eutamias quadrivitattus*. Most of the fleas were from the mice with but a minor series from the chipmunk. One is impressed by the number of species of fleas taken from the three host species in the somewhat restricted geographical area.

A list of species of fleas identified are tabulated below. Beneath each host the species of flea parasites are listed.

Peromyscus maniculatus	Peromyscus truei	Eutamias quadrivitattus
Callistopsyllus deuterus		
Catallagia decipiens		
Epitedia stanfordi	*Epitedia stanfordi*	*Epitedia stanfordi*
Malaraeus sinomus	*Malaraeus sinomus*	*Malaraeus sinomus*
Malaraeus telchinum	*Malaraeus telchinum*	*Malaraeus telchinum*
Megarthroglossus procus	*Megarthroglossus procus*	*Megaroglossus procus*
		Monopsyllus eumolpi eumolpi
Monopsyllus wagneri wagneri	*Monopsyllus wagneri wagneri*	*Monopsyllus wagneri wagneri*
Orchopeas leucopus	*Orchopeas leucopus*	

1. Brigham Young University, Department of Zoology and Entomology, Provo, Utah.
2. Curator of Natural History, Texas Memorial Museum, Austin, Texas.
3. Project support from the Wetherill Mesa Project, National Park Service, Department of the Interior.

Peromyscopsylla hesperomys adelpha	*Peromyscopsylla hesperomys adelpha* *Phalacropsylla allos* *Rhadinopsylla sectilis goodi*	*Peromyscopsylla hesperomys adelpha*
Stenistomera macrodactyla		
Stenoponia (ponera or americana)	*Stenoponia (ponera or americana)*	

Of the fourteen species listed, six are found on the three hosts. Two species have been taken from both species of *Peromyscus*, with three only collected from *P. maniculatus*. *Monopsyllus eumolpi eumolpi* was the only species apparently restricted to the chipmunk, with *Phalacropsylla allos* and *Rhadinopsylla sectilis goodi* confined to the pinyon mouse.

Of total numbers of fleas collected there were 81 *Monopsyllus wagneri wagneri* and 75 *Peromyscopsylla hesperomys adelpha*. Next in abundance was *Epitedia stanfordi* with 53 specimens. These were followed by 15 *Malaraeus sinomus*, 14 *Megarthroglossus procus*, 10 *Phalacropsylla allos*, and 6 *Orchopeas leucopus*. Other species collected were either as single specimens or from two to five specimens of each species.

In a recent study of fleas of the Nevada Test Site (Beck & Allred, 1966), a number of species listed for that area have been found in this study. Although the Nevada study was mainly in desert lowland, the species listed from there and those also found at the Mesa Verde location are generally similar in geographical distribution. The Nevada specimens were collected either in foothills or at higher elevations on mesas and low desert mountains. A brief review of Hubbard's study (1947) and that by Beck (1955), and more recently by Stark (1958), reveals for the most part, that the fleas taken at Mesa Verde National Park by Douglas are those characteristic of elevations of about 5,000 feet above sea level or higher. This would have special reference, of course, to such states as Arizona, New Mexico, Colorado, Utah, Nevada, Idaho, and perhaps parts of Wyoming.

Of significant interest to the writer was the encounter with specimens of the genus *Stenoponia*. At this writing it is difficult to make a firm, specific identification. The specimens show characteristics of both species as described in the literature; namely, *S. ponera* and *S. americana*.

In more than fifteen years of concentrated collecting by survey parties sent out from the Zoology and Entomology Department, Brigham Young University, Provo, Utah, no specimens of the interesting genus *Stenoponia* have been encountered in either Utah or Nevada. In Utah especially, collecting has been done at all elevations in varying ecological environments. It is strange that *Stenoponia* has not broken the desert plateau barrier to the west. It would

be interesting to find out if careful collecting toward the north of Mesa Verde National Park would provide duplicate collections in kind of species. The southwest corner of Colorado has vast pinyon-juniper woodlands extending along the border of Utah, and there is a continuous belt of growth out of Colorado to the foothills of the La Sal Mountains near Utah.

References Used

Beck, D E. 1955. Distributional studies of parasitic arthropods in Utah, determined as actual and potential vectors of Rocky Mountain Spotted Fever and plague, with notes on vector-host relationships. Brigham Young Univ. Sci. Bull., Biol. Ser., Vol. I. No. 1.

Beck, D E., and D. M. Allred. 1966. Siphonaptera (Fleas) of the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser., Vol. VII, No. 2.

Hopkins, G. H. E., and M. Rothschild. 1962. An illustrated catalog of the Rothschild collection of fleas in the British Museum. Vol. II. The University Press, Cambridge. England.

Hubbard. C. A. 1947. Fleas of western North America. Iowa State College Press, Ames, Iowa.

Stark, H. E. 1958. The Siphonaptera of Utah. U. S. Dept. of Health, Education and Welfare: Public Health Service, Bureau of State Services Communicable Disease Center, Atlanta. Georgia.

REFERENCES ON NEVADA TEST SITE ECOLOGICAL RESEARCH

Vincent Schultz[1]

The following references came to my attention while I was associated with the U. S. Atomic Energy Commission. The list has been restricted to research conducted on the area since the establishment of the Nevada Test Site. It includes papers resulting in their entirety from such efforts as well as papers covering a much broader geographical area but including data from the site.

Many current reports of the U. S. Atomic Energy Commission and its associates will probably appear in the open literature at some future date.

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References

Allred, D. M. 1963. Mites from pocket mice at the Nevada Test Site. (Acarina). Proc. Entomol. Soc. Wash. 65(3):231-233.

———. 1963. Mites on grasshopper mice at the Nevada atomic test site. Great Basin Nat. 22(4):101-104.

———. 1963. Mites on squirrels at the Nevada atomic test site. J. Parasitol. 48(6):817.

———. 1965. Note of phalangids at the Nevada Test Site. Great Basin Nat. 25(1-2):37-38.

Allred, D. M., and D E. Beck. 1962. Ecological distribution of mites on lizards at the Nevada atomic test site. Herpetologica 18(1):47-51.

———, and ———. 1963. Comparative ecological studies of animals at the Nevada Test Site. In: *Radioecology*. (V. Schultz and A. W. Klement, Jr., eds.) Reinhold Publ. Corp., N. Y., N. Y. pp. 327-331.

———, and ———. 1963. Ecological distribution of some rodents at the Nevada atomic test site. Ecology 44(1): 211-214.

———, and ———. 1963. Range of movement and dispersal of some rodents of the Nevada atomic test site. J. Mammal. 44(2):190-200.

———, and ———. 1964. Arthropod associates of plants at the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser. 5(2):1-16.

———,and ———. 1964 Mites on reptiles at the Nevada atomic test site. Trans. Am. Micro. Soc. 83(2):266-268.

Allred, D. M. and M. A Goates. 1964. Mites from mammals at the Nevada nuclear test site. Great Basin Nat. 24(2):71-73.

———, and ———. 1964. Mites from wood rats at the Nevada Test Site. J. Parasitol. 50(1):171.

Allred, D. M. and S. Mulaik. 1965. Two isopods of the Nevada Test Site. Great Basin Nat. 25(1-2):43-47.

Allred, D. M., D E. Beck, and C. D. Jorgensen. 1966. A summary of the ecological effects of nuclear testing on native animals at the Nevada Test Site. Proc. Utah Acad. Sci., Arts. and Letters 43:252-260.

———, ———, and ———. 1963. Biotic communities of the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser. 2(2):1-52; 1 map.

———, ———, and ———. 1963. Close-in effects of an underground nuclear detonation on small mammals and selected invertebrates (Project SEDAN).

1. Department of Zoology, Washington State University, Pullman, Washington 99163.

U. S. AEC Report PNE-226P. IV, 19 pp. (Final report: 1964, PNE 226F, IV, 18 pp.)

———, ———, AND ———. 1963. Nevada Test Site study areas and specimen depositories. Brigham Young Univ. Sci. Bull., Biol. Ser. 2(4):1-15.

ALLRED, D. M., D E. BECK, AND J. R. MURDOCK. 1960. Comparative ecological studies of animals exposed to nuclear detonation. Proc. Utah Acad. Sci., Arts, and Letters 37:152-153.

ALLRED, D. M., D. E. JOHNSON, AND D E. BECK. 1965. A list of some bee flies of the Nevada Test Site. Great Basin Nat. 25(1-2): 5-11.

ANDERSON, A. O., AND D. M. ALLRED. 1964. Kangaroo rat burrows at the Nevada Test Site. Great Basin Nat. 24(3-4):93-101.

BARNUM, A. H. 1964. Orthoptera of the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser. 4(3):1-134; 1 map.

BEATLEY, J. C. 1962. Vascular plants of the U. S. Atomic Energy Commission's Nevada Test Site, Nye County, Nevada. Univ. of Calif. at Los Angeles, U. S. AEC Report UCLA-508. 33 pp.

———. 1963. Annual vegetation of the northern Mojave Desert. (abstr.) Bull. Ecol. Soc. Am. 44(4):122-123.

———. 1963. Vegetation and environments of the Nevada Test Site. (abstr.) Bull. Ecol. Soc. Am. 44(4):123.

———. 1964. Ecological status of introduced species at the Nevada Test Site. (abstr.) Bull. Ecol. Soc. Am. 45(3):78.

———. 1964. Effects on desert vegetation of a nuclear detonation, Nevada Test Site. (abstr.) Bull. Ecol. Soc. Am. 45(3):80.

———. 1964. The vascular flora of the Nevada Test Site, Nye County, Nevada. (abstr.) Am. J. Botany 51(6):687.

———. 1965. Ecology of the Nevada Test Site. I. Geographic and ecologic distributions of the vascular flora (annotated check list). Univ. of Calif. at Los Angeles, U. S. AEC Report UCLA 12-553. 69 pp.

———. 1965. Ecology of the Nevada Test Site. II. Status of introduced species. Univ. of Calif. at Los Angeles, U. S. AEC Report UCLA 12-554. 39 pp.

———. J. C. 1965. Ecology of the Nevada Test Site. III. Survival of winter annuals, 1963-64. Univ. of Calif. at Los Angeles, U. S. AEC Report UCLA 12-555. 21 pp.

———. 1965. Ecology of the Nevada Test Site. IV. Effects of the Sedan detonation on desert shrub vegetation in northeastern Yucca Flat, 1962-65. Univ. of Calif. at Los Angeles, U. S. AEC Report UCLA 12-571. 55 pp.

———. 1965. Survival of winter annuals in the northern Mojave Desert. (abstr.) Bull. Ecol. Soc. Am. 46(2):40.

———. 1965. Effects of radioactive and nonradioactive dust upon *Larrea divaricata* Cav., Nevada Test Site. In: Radiation and Terrestrial Ecosystems. (Hungate, F. P., ed.) Health Physics 11(12):1621-1625.

BECK, D E., AND D. M. ALLRED. 1966. Siphonaptera (fleas) of the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser., 7(2):1-27.

———, AND ———. 1966. Tingidae, Neididae (Berytidae) and Pentatmoidae of the Nevada Test Site. Great Basin Nat. 26(1-2):9-16.

BECK, D E., D. M. ALLRED, AND E. P. BRINTON. 1963. Ticks of the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser. 4(1):1-11; 1 map.

BECK, D E., D. M. ALLRED, J. R. MURDOCK, C. D. JORGENSEN, C. L. HAYWARD, AND W. W. TANNER. 1964. Nevada Test Site desert ecology. Proc. Utah Acad. Sci., Arts, and Letters 41(2):202-209.

BRANDENBURG, M. K., H. L. MILLS, W. H. RICKARD, AND L. M. SHIELDS. 1962. Effects of acute gamma radiation on growth and morphology in *Pinus monophylla* Torr. and Frem. (pinyon pine). Radiation Botany 2(3-4):251-263.

BRENNAN, J. M. 1965. Five new chiggers from southwestern United States (Acarina: Trombiculidae). J. Parasitol. 51(1):108-113.

BRINTON, E. P., D E. BECK, AND D. M. ALLRED. 1965. Identification of the adults, nymphs and larvae of ticks of genus *Dermacentor* Koch (Ixodidae) in the western United States. Brigham Young Univ. Sci. Bull., Biol. Ser. 5(4): 1-44.

CHAMBERLIN, R. V. 1962. Millipeds from the Nevada test area. Proc. Biol. Soc. Wash. 75:53-56.

———. 1962. New records and species of chilopods from Nevada and Oregon. Entomol. News 73(5):134-138.
———. 1963. A new genus in the chilopod family Tanpiyidae. Proc. Biol. Soc. Wash. 76:33-36.
———. 1965. A new genus and species in the chilopod family Tampiyidae. Great Basin Nat. 25(1-2):39-42.
Cole, A. C. 1963. A new species of *Veromessor* Forel from the Nevada Test Site and notes on related species (Hymnoptera: Formicidae). Ann. Entomol. Soc. Am. 56(5):678-682.
———. 1965. Discovery of the worker caste of *Pheidole* (*P.*) *inquilina*, new combination (Hymenoptera: Formicidae). Ann. Entomol. Soc. Am. 58(2): 173-175.
Cole, A. C., Jr. 1966. Ants of the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser. 7(3):1-27.
Drouet, F. 1959. Algal flora of the Nevada Test Site. (abstr.) J. Colorado-Wyoming Acad. Sci. 4(11):31.
Durrell, L. W., and L. M. Shields. 1960. Fungi isolated in culture from soils of the Nevada Test Site. Mycologia 52(4):636-641.
———, and ———. 1961. Characteristics of soil algae relating to crust formation. Trans. Am. Micro. Soc. 80(1):73-79.
French, N. R. 1963. The source of ingested radioactivity in desert rodents. (abstr.) Bull. Ecol. Soc. Am. 44(3):74.
———. 1963. Fallout and natural populations. In: Proc. First Intern. Conf. on Wildlife Disease. High View, New York, June 24-27, 1962. Wildlife Disease Assoc., pp. 152-156. (micro card).
———. 1964. A radiation facility for ecological studies at the AEC Nevada Test Site. (abstr.) Bull. Ecol. Soc. Am. 45(3):79.
———. 1964. Analysis of dispersal in desert rodents. (abstr.) Bull. Ecol. Soc. Am. 45(3):115.
———. 1964. Description of a study of ecological effects on a desert area from chronic exposure to low level ionizing radiation. Univ. of Calif. at Los Angeles, U. S. AEC Report UCLA 12-532. 27 pp., 15 figures.
———. 1965. Mortality and fertility in a desert population of pocket mice. (abstr.) Bull. Ecol. Soc. Am. 46(3):122.
———. 1965. Radiation and animal populations: problems, progress and projections. In: Radiation and Terrestrial Ecosystems. (Hungate, F. P., ed.) Health Physics 11(12):1557-1568.
French, N. 1966. Irradiated desert rodent populations. In: Radiation Effects on Natural Populations. (Sacher, G. A., ed.). Div. of Biological and Medical Research, Argonne National Lab., Lemont, Ill. p. 22.
French, N. R., and K. H. Larson. 1963. Environmental pathways of radioactive iodine from nuclear tests in arid regions. In: *Radioecology*. (V. Schultz and A. W. Klement, Jr., eds.). Reinhold Publ. Corp., N. Y., N. Y. pp. 77-81. (Also: Univ. of Calif. at Los Angeles, U. S. AEC Report UCLA-499).
French, N. R., B. G. Maza, and A. P. Aschwanden. 1965. Duration of life in confined populations of desert rodents. (abstr.) Bull. Ecol. Soc. Am. 46(2):40.
Furman, D. P., and F. J. Radovsky. 1963. A new species of *Ornithonyssus* from the white-tailed antelope squirrel, with a re-diagnosis of the genus *Ornithonyssus* (Acarina: Dermanyssidae). Pan-Pacific Entomologist 39(2): 75-79.
Garcia, P. L. 1960. The influence of *Larrea divaricata* and *Atriplex canescens* on soil pH, electrical conductivity and soluble sodium content. Master's Thesis, New Mexico Highlands Univ., Las Vegas, New Mexico. vii, 63 pp.
Gertsch, W. J., and D. M. Allred. 1965. Scorpions of the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser. 6(4):1-15.
Goates, M. A. 1963. Mites on kangaroo rats at the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser. 3(4):1-12; 2 maps.
Haley, T. J., R. G. Lindberg, A. M. Fiesher, K. Raymond, W. McKibben, and P. Hayden. 1960. Response of the kangaroo rat (*Dipodomys merriami* Mearns) to single wholebody x-irradiation. Radiation Research 12(1):103-111. (Also: Univ. of Calif. at Los Angeles, U. S. AEC Report UCLA-440).
Hall, W. P., III. 1965. Microclimatic factors. (abstr.) Bull. Ecol. Soc. Am. 46(2):50.

HARVEY, R. A. 1965. Assessment of radiation effects of desert shrubs. (abstr.) Bull. Ecol. Soc. Am. 46(2):50.

HAYWARD, C. L., M. L. KILLPACK, AND G. RICHARDS. 1963. Birds of the Nevada Test Site, Nye County, Nevada. Brigham Young Univ. Sci. Bull., Biol. Ser. 3(1):1-27; 1 map.

HERRIN, C. S., AND D E. BECK. 1965. Observations on the biology, anatomy, and morphology of *Otobius lagophilus* Cooley and Kohls. Brigham Young Univ. Sci. Bull., Biol. Ser. 6(2):1-19.

HILL, H. O. 1965. Composition of the shrub community. (abstr.) Bull. Ecol. Soc. Am. 46(2):50.

JORGENSEN, C. D. 1962. Disturbance of mammal traps by jack rabbits. Great Basin Nat. 22(1-3):83-86.

———. 1963. Spacial and time distribution of *Dipodomys microps occidentalis* Haldeman. (Scarabaeidae: Rutelinae). Pan-Pacific Entomologist 39(3): 154-156.

———. 1963. Spacial and time distribution of *Dipodomys microps occidentalis* Hall and Dale within distinct plant communities. Ecology 44(1):183-187.

JORGENSEN, C. D., AND C. L. HAYWARD. 1963. Notes on shrews from southern Nevada. J. Mammal. 44(4):582.

———, AND ———. 1965. Mammals of the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser. 6(3):1-81.

JORGENSEN, C. D., AND A. M. ORTON. 1962. Note of lizards feeding on oatmeal bait. Herpetologica 17(4):278.

JORGENSEN, C. D., AND W. W. TANNER. 1963. The application of the density probability function to determine the home ranges of *Uta stansburiana* and *Cnemidophorus tigris*. Herpetologica 19(2):105-115.

JORGENSEN, C. D., D. M. ALLRED, AND D E. BECK. 1963. Some effects of an underground nuclear detonation on biotic communities at the Nevada Test Site. Proc. Utah Acad. Sci., Arts, and Letters 40(1):49-61.

JORGENSEN, C. D., A. M. ORTON, AND W. W. TANNER. 1963. Voice of the leopard lizard, *Crotaphytus wislizeni* Baird and Girard. Proc. Utah Acad. Sci., Arts, and Letters 40(1):15-16.

KILLPACK, M. L., AND M. A. GOATES. 1963. Bat captured in snap trap. J. Mammal. 44(1):125-126.

LARSON, K. H., AND J. W. NEEL. 1959. Findings related to the testing program at Nevada Test Site. In: Fallout from Nuclear Weapons Tests. Joint Committee on Atomic Energy, Congress of the United States 3:2006-2020. (Also: Univ. of Calif. at Los Angeles, U. S. AEC Report UCLA-438).

LARSON, K. H., H. A. HAWTHORNE, AND J. H. OLAFSON. 1962. Nevada Test Site fallout: some characteristics, its apparent environmental equilibrium and biological availability. In: Radioactive Fallout from Nuclear Weapons Tests. (A. W. Klement, Jr., ed.) U. S. AEC Report TID-7632. Book 1, pp. 4-24.

LARSON, K. H., J. H. OLAFSON, H. M. MORK, AND D. R. HOWTON. 1952. Field observations and preliminary field data obtained by the UCLA survey group, Operation Jangle, Nov. 1951. Univ. of Calif. at Los Angeles, U. S. AEC Report UCLA-182. 29 pp.

LEITCH, J. L. 1951. Summary of the radiological findings in animals from the biological surveys of 1947, 1948, 1949, and 1950. Univ. of Calif. at Los Angeles, U. S. AEC Report UCLA-111. 30 pp.

LINDBERG, R. G. 1959. Factors influencing the biological consequences of environmental contamination by nuclear debris. Proc. of the Second Plowshare Symposium, May 13-15, 1959, San Francisco, California. Part II. Excavation. Univ. of Calif., Livermore, Plowshare Series Report 2, U. S. AEC Report UCRL-5675. pp. 42-59.

LINDBERG, R. G., AND K. H. LARSON. 1956. The short-term biological fate and persistence of radioactive fallout as measured at various locations within fallout patterns. In: The Shorter-Term Biological Hazards of a Fallout Field. (G. M. Dunning and J. A. Hilchen, eds.) U. S. AEC and Department of Defense. U. S. Government Printing Office, Washington. pp. 197-204

LINDBERG, R. G., E. M. ROMNEY, J. H. OLAFSON, AND K. H. LARSON. 1959. The factors influencing the biological fate and persistence of fallout (Operation

Teapot). Univ. of Calif. at Los Angeles, U. S. AEC Weapons Test Report WT-1177. 78 pp.

Lindberg, R. G., J. T. Scanlan, J. C. Watson, W. A. Rhoads, and K. H. Larson. 1954. Environmental and biological fate of fallout from nuclear detonations in areas adjacent to the Nevada Proving Grounds, Operation Upshot-Knothole Univ. of Calif. at Los Angeles, U. S. AEC Weapons Test Report WT-812. 49 pp.

Lucas, A. C., and N. R. French. 1966. A miniature thermoluminescent dosimeter and its application. Proc. Intern. Conf. on Luminescence Dosimetry. Held in June 1965, Stanford Univ., Stanford, Calif. (In press.)

Martin, W. E. 1962. Applications of fundamental biology to the needs of man. 4. Radioecology and the study of environmental radiation. Univ. of Calif. at Los Angeles, U. S. AEC Report TID-16060. 70 pp.

———. 1962. Immediate effects of a nuclear detonation on desert vegetation. (abstr.) Bull. Ecol. Soc. Am. 43(4):123-124.

———. 1963. Close-in effects of an underground nuclear detonation on vegetation. I. Immediate effects of cratering, throw-out, and blast (Project SEDAN). U. S. AEC Report PNE-228P. 41 pp. (Final report 228F, in press.).

———. 1963. Notes on the deposition of fallout in relation to topography and local meteorological conditions. Univ. of Calif. at Los Angeles, U. S. AEC Report UCLA-513. 16 pp.

———. 1963. Loss of I^{131} from fallout-contaminated vegetation. Health Physics 9(12): 1141-1148.

———. 1964. Radioecology and the study of environmental radiation. Bull. Torrey Bot. Club 91(4):283-323.

———. 1964. Losses of Sr^{90} and ^{89}, and I^{131} from fallout-contaminated plants. Radiation Botany 4(3):275-284.

———. 1965. Radiation facilities and objectives. (abstr.) Bull. Ecol. Soc. Am. 46(2):39.

———. 1965. Early food-chain kinetics of radionuclides following close-in fallout from a single nuclear detonation. In: Radioactive Fallout from Nuclear Weapons Tests. (Klement, A. W., Jr., ed.) U. S. AEC Symposium Series No. 5. pp. 758-782.

———. 1965. Interception and retention of radioactive fallout by desert shrubs in the Sedan fallout field. U. S. AEC Report PNE-238F. 40 pp.

———. 1965. Interception and retention of fallout by desert shrubs. In: Radiation and Terrestrial Ecosystems. (Hungate, F. P., ed.) Health Physics 11(12): 1341-1354.

———. 1966. Close-in effects of nuclear excavation and radiation on desert vegetation. In: Radiation Effects on Natural Populations. (Sacher, G. A., ed.) Div. of Biological and Medical Research, Argonne National Lab., Lemont, Ill. pp. 7-9.

Martin, W. E., and F. B. Turner. 1963. Increased environmental radiation in southern Nevada, October-December, 1961. Univ. of Calif. at Los Angeles, U. S. AEC Report UCLA-518. 45 pp.

———, and ———. 1965. Food-chain relationships of radiostrontium in the Sedan fallout field. U. S. AEC Report PNE-237F. iv, 61 pp.

———, and ———. 1966. Transfer of Sr^{89} from plants to rabbits in a fallout field. Health Physics 12 (In press).

Mills, H. L., and L. M. Shields. 1961. Root absorption of fission products by *Bromus rubens* L. from the AEC Nevada Test Site soil contaminated by an underground nuclear explosion. Radiation Botany 1(1):84-91.

Muma, M. H. 1962. The Arachnid Order Solpugida in the United States, Supplement 1. Amer. Mus. Novitates 2092:1-44.

———. 1963. Solpugida of the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser. 3(2):1-13; 2 maps.

Neel, J. W., and K. H. Larson. 1963. Biological availability of strontium-90 to small native animals in fallout patterns from the Nevada Test Site. In: *Radioecology*. (V. Schultz and A. W. Klement, Jr., eds.) Reinhold Publ. Corp., N. Y., N. Y. pp. 45-49. (Also: Univ. of Calif. at Los Angeles, U. S. AEC Report UCLA-500).

OLAFSON, J. H., J. W. NEEL, C. J. SPIEGL, R. H. WILSON, F. G. LOWMAK, AND K. H. LARSON. 1953. Preliminary study of off-site, air-borne radioactive materials, Nevada proving grounds, I. Fallout originating from Snapper 6, 7, and 8 at distances of ten to fifty miles from ground zero. Univ. of Calif. at Los Angeles, U. S. AEC Report UCLA-243. 123 pp.

RAVEN, P. H. 1964. *Polypogon australias Bronga* in Nevada. Leaf. West. Bot. 10:117.

RICHARDS, G. 1962. Wintering habits of some birds at the Nevada atomic test site. Great Basin Nat. 22(1-3):30-31.

RICHARDS, G. L. 1965. Prairie falcon imitates flight pattern of the loggerhead shrike. Great Basin Nat. 25(1-2):48.

RICKARD, W. H. 1959. Gross vegetation patterns within the Nevada Test Site. (abstr.) J. Colorado-Wyoming Acad. Sci. 4(11):32.

———. 1961. Notes on bird nests found in a desert shrub community following nuclear detonations. Condor 63(3):265-266.

———. 1962. Phytosociological analysis in a desert shrub community following atomic explosions. Hanford Labs., U. S. AEC Report HW-SA-2546. 7 pp.

———. 1963. Vegetational analyses in a creosote bush community and their radioecologic implications. In: *Radioecology*. (V. Schultz and A. W. Klement, Jr., eds.) Reinhold Publ. Corp., N. Y., N. Y. pp. 39-44.

RICKARD, W. H., AND J. C. BEATLEY. 1965. Canopy-coverage of the desert shrub vegetation mosaic of the Nevada Test Site. Ecology 46(4):524-529.

RICKARD, W. H., AND J. R. MURDOCK. 1963. Soil moisture and temperature survey of a desert vegetation mosaic. Ecology 44(4):821-824.

RICKARD, W. H., AND L. M. SHIELDS. 1963. An early stage in the plant recolonization of a nuclear target area. Radiation Botany 3(1):41-44.

ROWLAND, R. H., AND F. B. TURNER. 1964. Correlation of the local distributions of *Dipodomys microps* and *D. merriami* and of the annual grass *Bromus rubens*. Southwestern Nat. 9(2):56-61.

SCHULTZ, V. (ed.; comp.). 1961. Off-site ecological research of the Division of Biology and Medicine - terrestrial and freshwater. U. S. AEC Report TID-13358. VII, 138 pp.; 1st Revision, V, 122 pp. (1963); 2nd Revision, V, 129 pp. (1965).

SHIELDS, L. M. 1959. Recovery of vegetation in the vicinity of ground zero sites. (abstr.) J. Colorado-Wyoming Acad. Sci. 4(11):30-31.

———. 1959. An appraisal of radiation effects on vegetation within the Nevada Test Site. (abstr.) Proc. IX Intern. Botanical Congr. IIA:33.

SHIELDS, L. M., AND F. DROUET. 1962. Distribution of terrestrial algae within the Nevada Test Site. Am. J. Botany 49(6):547-554.

SHIELDS, L. M., AND W. H. RICKARD. 1960. Recovery of vegetation in the vicinity of ground zeros at the Nevada Test Site. (abstr.) Bull. Ecol. Soc. Am. 41(4):119.

———, AND ———. 1961. A preliminary evaluation of radiation effects at the Nevada Test Site. In: *Recent Advances in Botany*, Univ. of Toronto Press, Toronto, Canada. pp. 1387-1390.

SHIELDS, L. M., AND P. V. WELLS. 1962. Effects of nuclear testing on desert vegetation. Science 135(3497):38-40.

———, AND ———. 1963. Recovery of vegetation in the vicinity of atomic target areas at the Nevada Test Site. In: *Radioecology*. (V. Schultz and A. W. Klement, Jr., eds.) Reinhold Publ. Corp., N. Y., N. Y. pp. 307-310.

SHIELDS, L. M., L. W. DURRELL, AND A. H. SPARROW. 1961. Preliminary observations of radiosensitivity of algae and fungi in soils from the Nevada Test Site. Ecology 42(2):440-441.

SHIELDS, L. M., P. V. WELLS, AND W. H. RICKARD. 1963. Vegetational recovery on atomic target areas in Nevada. Ecology 44(4):697-705.

STEVENSON, E. W. 1965. Soil types. (abstr.) Bull. Ecol. Soc. Am. 46(2):50.

TANNER, V. M. 1963. A new species of *Craniotus* (Coleoptera: Tenebrionidae). Great Basin Nat. 23(3-4):167-170.

———. 1966. Rhynchophora beetles of the Nevada Test Site. Brigham Young Univ. Sci. Bull. Ser. 8(2):1-35.

TANNER, V. M., AND W. A. PACKHAM. 1962. *Pelecyphorus semilaevis* (Horn) (Coleoptera: Tenebrionidae). Great Basin Nat. 22(4):110-113.

———, AND ———. 1965. Tenebrionidae beetles of the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser. 6(1):1-44.

TANNER, W. W., AND B. H. BANTA. 1962. The distribution of *Tantilla utahensis* Blanchard. Great Basin Nat. 12(4):116-118.

TANNER, W. W., AND C. D. JORGENSEN. 1963. Reptiles of the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser. 3(3):1-31; 1 map.

TOWNER, J. W. 1965. The effect of radioactive fallout at the Nevada Test Site on the chromosomes of native populations of the pocket mouse. In: Radiation and Terrestrial Ecosystems. (Hungate, F. P., ed.) Health Physics 11(12): 1569-1571.

TURNER, F. B. 1962. Some influences of an underground nuclear detonation on close-in populations of whiptailed lizards (*Cnemidorphorus tigris*) at the Nevada Test Site. (abstr.) Bull. Ecol. Soc. Am. 43(4):124.

———. 1963. A mathematical model for time-specific relationships of I^{131} between food consumed and the thyroid burden. (abstr.) Bull. Ecol. Soc. Am. 44(3):75.

———. 1963. Biotic communities of the Nevada Test Site (a review). Ecology 44(3):663-664.

———. 1963. Influence of a cratering device on close-in populations of lizards (Project SEDAN). U. S. AEC Report PNE-224F. vi, 35 pp.

——. 1963. Quantitative relationships between fallout radioiodine on native vegetation and in the thyroids of herbivores. Health Physics 9(12):1241-1246.

———. 1965. Uptake of fallout radionuclides by mammals and a stochastic simulation of the process. In: Radioactive Fallout from Nuclear Weapons Tests, (Klement, A. W., Jr., ed.). U. S. AEC Symposium Series No. 5, pp. 800-820.

———. 1966. Growth rate of lizards (*Uta stansburiana*) exposed to chronic gamma radiation. In: Radiation Effects of Natural Populations. (Sacher, G. A., ed.) Div. of Biological and Medical Research, Argonne National Lab., Lemont Ill. pp. 46-52.

TURNER, F. B., AND C. S. GIST. 1965. Influence of a thermonuclear cratering test on close-in populations of lizards. Ecology 46(6):845-852.

TURNER, F. B., AND W. E. MARTIN. 1963. Food-chain relationships of iodine-131 following two nuclear tests in Nevada (Project SEDAN). U. S. AEC Report PNE-236. 70 pp. (Final Report: 1964 PNE-236F, pp. 5-54.)

TURNER, F. B., G. A. HODDENBACH, AND J. A. LANNOM. 1965. Growth of *Uta stansburiana* in four experimental areas at the Nevada Test Site. (abstr.) Bull. Ecol. Soc. Am. 46(2):51.

TURNER, F. B., G. A. HODDENBACH, AND J. R. LANNOM, JR. 1965. Growth of lizards in natural populations exposed to gamma irradiation. In: Radiation and Terrestrial Ecosystems. (Hungate, F. P., ed.) Health Physics 11(12): 1585-1593.

TURNER, F. B., R. H. ROWLAND, AND R. A. WOOD. 1965. Radioactivity in jack rabbits after the Sedan test of 1962. Univ. of Calif. at Los Angeles, U. S. AEC Report, UCLA-12-572. 26 pp.

———, ———, AND ———. 1966. Nuclear engineering and wildlife: radioactivity in jackrabbits after the Sedan test. J. Wildl. Mgt. 30(2):433-443.

TURNER, F. B., B. KOWALEWSKY, R. H. ROWLAND, AND K. H. LARSON. 1963. Uptake of radioactive materials from a nuclear reactor by small mammals at the Nevada Test Site. Health Physics 10(1):65-68. (Also: Univ. of Calif. at Los Angeles, U. S. AEC Report TID-18864.)

WELLS, P. V. 1961. Succession in desert vegetation on streets of a Nevada ghost town. Science 134(3480):670-671.

———. 1964. Pleistocene vegetation in the Mohave Desert: some woodrat midden evidence. (abstr). Bull. Ecol. Soc. Am. 45(3):76.

WELLS, P. V., AND C. D. JORGENSEN. 1964. Pleistocene wood rat middens and climate change in Mohave Desert: A record of juniper woodlands. Science 143(3611):1171-1173.

WELLS, P. V., AND L. M. SHIELDS. 1961. Disturbance and succession in desert vegetation on the Nevada Test Site of the U. S. Atomic Energy Commission. (abstr.) Bull. Ecol. Soc. of Am. 42(3):109.

———, AND ———. 1962. Distribution of *Larrea* in relation to a temperature inversion in Yucca Flat, Nevada. (abstr.) Bull. Ecol. Soc. Am. 43(4):118.
———, AND ———. 1964. Distribution of *Larrea* in relation to temperature zonation at the Nevada Test Site. Southwestern Nat. 9:51-55.
WHITE, L. D. 1962. Concrete molds of rodent burrows. J. Mammal. 43(2):265.
WHITE, L. D., AND D. M. ALLRED. 1961. Range of kangaroo rats in areas affected by atomic detonations. Proc. Utah Acad. Sci., Arts, and Letters 38(1):101-110.

A SYSTEMATIC REVIEW OF THE GREAT BASIN REPTILES IN THE COLLECTIONS OF BRIGHAM YOUNG UNIVERSITY AND THE UNIVERSITY OF UTAH

Wilmer W. Tanner and Benjamin H. Banta[1]

Introduction

This report is one of a planned series of analyses of reptile specimens taken from the Great Basin and now deposited in the major institutional repositories of the western United States. We hope and anticipate that such reports will provide a more adequate systematic and distributional picture of the Great Basin reptile fauna.

At present we are concerned mainly with the species occurring in this region and specimen locality data. If such can be completed we would then perhaps have a nearly complete list of species and subspecies occurring in the basin as well as the distribution limits of each.

The general physical environment and historical aspects of the Great Basin have been treated in recent works by Banta (1963a) and Banta and Tanner (1964). The general physical delimitation of the Great Basin in this account is based largely upon the 1953 edition of the map "Water Resources Development of the United States," by the United States Geological Survey. We have made one correction in southern Nevada and perhaps other minor details should be adjusted. However, we find the map to be useful and generally accurate even in most details. Figure 1 illustrates the physical definition of the Great Basin in addition to the political subdivisions of and within the area as used herein.

The following is a check list of the counties of the states making up the Great Basin. An asterisk (*) preceding a county name indicates that this particular county is located on the border and is thus not located in its entirety within the Great Basin.

California	*Harney	*Washington
*Modoc	*Malheur	*Kane
*Lassen		
*Sierra	Utah	Nevada
*Nevada	*Box Elder	Washoe
*Placer	Cache	Storey
*Eldorado	Rich	Ormsby
*Alpine	Morgan	Douglas
Mono	Weber	Lyon

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Brigham Young University, Provo, Utah and Michigan State University, East Lansing, Michigan.

Inyo
*Kern
*Los Angeles
*San Bernardino

IDAHO
*Cassia
Oneida
Franklin
Bear Lake
*Caribou
*Bannock
*Power

OREGON
*Lake

Davis
Tooele
Salt Lake
*Summit
*Duchesne
*Wasatch
Utah
Juab
Sanpete
*Sevier
Millard
Beaver
Piute
*Wayne
*Garfield
*Iron

*Humboldt
Pershing
Churchill
Mineral
Esmeralda
*Elko
Lander
Eureka
*Nye
*White Pine
*Lincoln
*Clark

WYOMING
*Lincoln
*Uinta

MATERIAL AND METHODS

The Department of Zoology and Entomology collections at Brigham Young University, Provo, Utah, and the University of Utah, Salt Lake City, contain a large number of representative specimens of reptile species inhabiting the Great Basin, especially the eastern Bonneville portion. Recent collections have added measurably to the southern Nevada collections, primarily from the Nevada Atomic Test Site. These collections are at Brigham Young University. It is the purpose of this paper to present analyses of these collections with emphasis on the external morphological variation and geographical distribution of each reptile species.

Basic nomenclature of genera and species is that of Schmidt (1953) with appropriate changes which have since appeared. Species of genera represented by more than one species are organized alphabetically by species name. Distributional records, under the heading *Material Examined*, are listed by state, county, and specific locality. Following each locality, designated by parentheses, is the serial number or numbers of the specific specimen or specimens. Altitudes for some of the localities were determined and are listed in the Checklist of Localities.

Summarized data demonstrating variation of certain morphological characters of the reptiles examined are given under the heading *Variation*. An attempt is made to show the extent of variation in samples examined. All measurements are in millimeters. Discussions of nomenclatural problems are provided when they can be either modified or clarified by this study. Brief discussions of ideas concerning the historical movement of progenitors of existing populations are included under the heading *Remarks*.

We have on several occasions been faced with the perennial question: To which subspecies does this population belong? Because a complete understanding of the basic systematics of all of the species

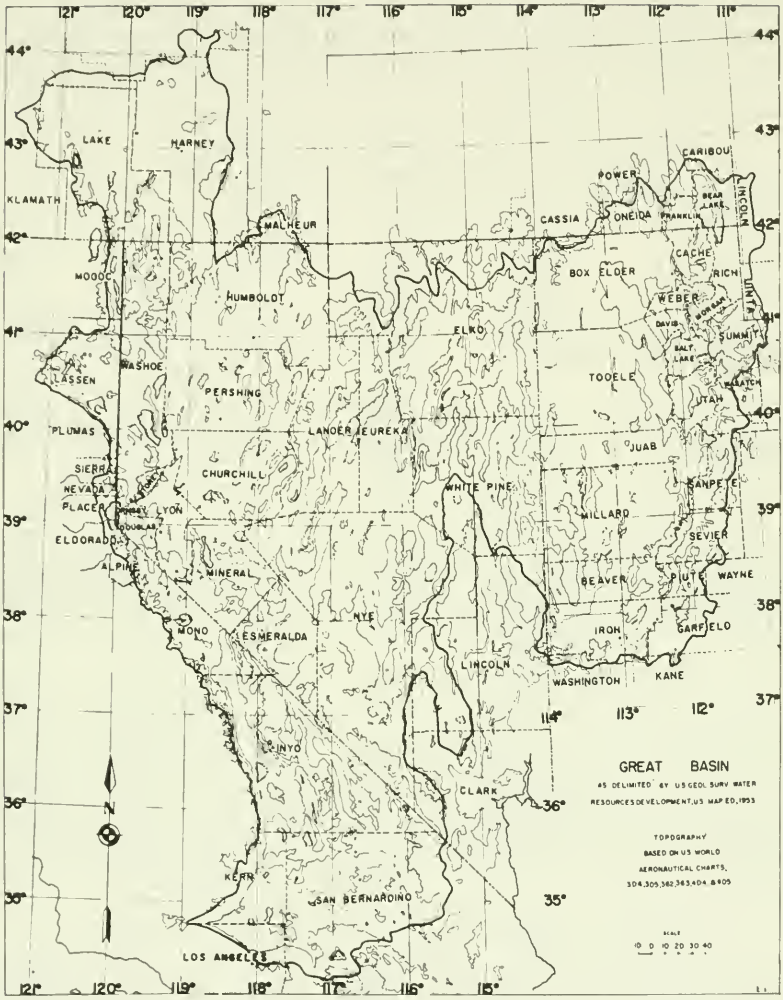

Figure 1. Delimitation of the Great Basin (dark irregular line) showing the various political subdivisions by county. As shown here the Great Basin encompasses most of the state of Nevada, the western half of Utah, eastern California, southeastern Oregon, southeastern Idaho, and the southwestern corner of Wyoming.

of Great Basin reptile populations has not been completed, we have delayed this report several years while other studies were being completed. There is much remaining to be done on reptiles of the Great Basin; however, we believe that enough information and material is now available to justify the completion of this study. Unfortunately, the samples of many populations are limited and thus it is impossible to adequately demonstrate the range of variation. These, however, will be augmented as other studies are completed.

Abbreviations: The following is a list of abbreviations of words and terms standardized throughout this study:

I. Political Subdivisions

A. States

California - CALIF.; Oregon - ORE.; Idaho - IDA.; Utah - UTAH; Nevada - NEV.; Wyoming - WYO.

B. Counties

Bear Lake - B.L.; San Bernardino - S.B.; Los Angeles - L.A.; White Pine - W.P.; Salt Lake - S.L.

II. Directions

E - east of; S - south of; ENE - east northeast of; SE - southeast of; ESE - east southeast of; SSE - south southeast of; N - north of; SW - southwest of; NE - northeast of; SSW - south southwest of; NNE - north northeast of; W - west of; NW - northwest of; WNW - west northwest of; NNW - north northwest of; WSW - west southwest of.

III. Geographic and Miscellaneous Terms[2]

adj. - adjacent; bdry. - boundary; cn. - canyon; co. - county; cr. - creek; des. - desert; exp. sta. - experiment station; fk. - fork; ft. - fort; gov't. - government; gr. - grove; hd. - head; hwy. - highway; L. - lake; mdw. - meadow; mn. - mine; mth. - mouth; mtn. - mountain, mountain range; N F - national forest; N M - national monument; N P - national park; NTS - Nevada Test Site; nr. near; P G - Proving Ground; pk. - peak; P O - post office; pt. - point; R. - river; rch. - ranch; rd. - road; RR - railroad; R S - ranger station (U.S. Forest Service); sta. - station; tr. - trail; V. - valley; vic. - vicinity of.

Historical Chronology of Collecting Activity

A preliminary account of the history of studies on Great Basin reptiles is that of Banta and Tanner (1964). No attempt will be made to repeat the comments of that work relating to herpetological activities at Brigham Young University (B.Y.U.) and the University of Utah (U. of U.). Certain individuals such as Vasco M. Tanner, D Elden Beck, and Wilmer W. Tanner (B.Y.U.) and A. M. Woodbury, John W. Twente, Jr., and John M. Legler (U. of U.) have been most helpful and have permitted us at various times to use the facilities at these institutions. For these courtesies we are most grateful.

[2]Many of these abbreviations are used in the Checklist of Localities and in the Materials Examined section of each species discussion.

A listing of people active in collecting reptile specimens within the Great Basin for deposition in the collections of Brigham Young University and the University of Utah according to the year or years of their activities, including a listing of the Great Basin country or counties in which samples were made follows:

CHRONOLOGY OF COLLECTING ACTIVITY

YEAR	PERSON	STATE	COUNTY	INSTITUTION
1884	O. Howard	Utah	Tooele	U. of U.
1901	D. Franklin	Utah	Sanpete	U. of U.
1902	F. Coofts & F. Maquoti	Nev.	Washoe	U. of U.
1909	S. E. Aldous	Utah	Cache	U. of U.
1916	H. J. Pack[3]	Utah	S.L.	B.Y.U.
1917	C. J. Jensen	Utah	Weber	U of U.
1920	G. H. Hansen	Utah	Beaver	B.Y.U.
	H. J. Pack	Utah	Cache Iron Tooele	B.Y.U.
1921	H. J. Pack	Utah	S.L.	B.Y.U
1923	H. J. Pack	Utah	Tooele	B.Y.U.
1924	S. E. Aldous	Utah	Sanpete	U. of U.
1925	V. M. Tanner	Utah	Millard Juab	B Y.U.
1926	B. Decker H. Hutchings	Utah	Utah	B.Y.U.
	V. M. Tanner	Utah	Juab Millard Sanpete	B.Y.U.
1927	S. E Aldous	Utah	Tooele	U. of U.
	W. Bailey J. J. Weight	Utah	Utah	U. of U.
	R. V. Chamberlain	Utah	Iron Tooele Utah	U. of U.
	A. C. Jensen	Utah	S.L.	U. of U.
	I. Rasmussen	Utah	Utah	B.Y.U.
	L. Reed	Utah	Millard	U. of U.
	A. M. Woodbury	Utah	Sanpete Tooele Utah	U. of U.
1928	D E. Beck C. J. D. Brown J. Kartchner	Utah	Utah	B.Y.U.

3. H. J. Pack's collection was originally deposited at the Utah State Agricultural College (Utah State University), Logan, Utah. Part of the collection was destroyed or lost owing to lack of curatorial attention. Dr. G. F. Knowlton gave the remainder of the collection to B.Y.U. in 1956.

1928	D. Liddle	Utah	Utah	B.Y.U.
	M. Stevenson			
	M. Stewart			
	W. J. Gertsch	Utah	S.L.	U. of U.
	W. W. Newby			
	A. M. Woodbury			
	A. C. Jensen	Utah	Tooele	U. of U.
	W. Robinson	Utah	Piute	B.Y.U.
	V. M. Tanner	Nev.	Elko	B.Y.U.
			W. P.	
		Utah	Box Elder	B.Y.U.
			Juab	
			Millard	
			Tooele	
1929	W. Ivie	Utah	S.L.	U. of U.
	V. M. Tanner	Utah	Garfield	B.Y.U.
			Millard	
1930	E. W. Fowlks	Utah	Sevier	U. of U.
	F. Gramse			
	V. M. Tanner	Utah	Millard	B.Y.U.
	A. M. Woodbury	Utah	Millard	B.Y.U.
	D. Woodbury			
1931	C. L. Hayward	Utah	Iron	B.Y.U.
1932	W. H. Behle	Utah	Box Elder	U. of U.
	V. Parkinson	Utah	S.L.	U. of U.
	C. Snow			
1933	H. E. Dorst	Utah	Tooele	U. of U.
	P. Klauber	Calif.	S.B.	U. of U.
	V. Parkinson	Utah	S.L.	U. of U.
1936	W. W. Tanner	Utah	Utah	B.Y.U.
	A. M. Woodbury	Utah	Box Elder	U. of U.
			S.L.	
			Tooele	
			Utah	
			Wasatch	
	D. Woodbury &		Tooele	U. of U.
	W. Woodbury			
1937	J. W. Bee	Ida.	B.L.	B.Y.U.
	J. W. Bell	Utah	Utah	B Y.U.
	C. Tanner			
	H. Thomas			
	K. Duke	Utah	Wasatch	B.Y.U.
	S. Flowers	Utah	Juab	U. of U.
	C. L. Hayward	Utah	Utah	B.Y.U.
	M. Marchant	Utah	Summit	B.Y.U.
	V. M. Tanner	Utah	Millard	B.Y.U.
	W W. Tanner	Utah	Utah	B.Y.U.
1938	W. W. Tanner	Utah	Utah	B.Y.U.
	A. M. Woodbury	Utah	S L.	U. of U.

1939	B. Hunt	Utah	Juab	B.Y.U.
	R. Liechty	Utah	Iron	B.Y.U.
	W. W. Newby	Utah	S.L.	U. of U.
	A. M. Woodbury			
	D. Woodbury			
	H. W. Setzer	Utah	Davis	U. of U.
			S.L.	
			Tooele	
			Utah	
	M. H. Chandler	Utah	S.L.	B.Y.U.
1939	V. M. Tanner	Utah	Carbon	B.Y.U.
			Sevier	
	W. W. Tanner	Utah	Utah	B.Y.U.
			Cache	
			Sanpete	
1940	L. Hansen	Utah	Sanpete	B.Y.U.
	D. Beeler	Utah	Utah	U. of U.
	W. Woodbury			
	C. M. Greenhalgh	Utah	S.L.	U. of U.
	T. A. Woolley			
	L. Olson	Utah	Tooele	U. of U.
	H. W. Setzer	Utah	S.L.	U. of U.
	A. M. Woodbury		Tooele	
			Utah	
	D. Woodbury	Utah	Tooele	U. of U.
			Utah	
1941	H. Chandler	Utah	Millard	B.Y.U.
	M. M. Snow			
	Crawford	Utah	Utah	B.Y.U.
	V. M. Tanner			
	K. Smith	Utah	Box Elder	B.Y.U.
	W. W. Tanner	Nev.	Elko	B.Y.U.
		Utah	Millard	
			Tooele	
1942	S. D. Durrant	Utah	Tooele	U. of U.
	E. Kunzler	Utah	Box Elder	U. of U.
	W. W. Tanner	Utah	Utah	B.Y.U.
1944	G. F. Knowlton	Utah	Beaver	B.Y.U.
	V. M. Tanner	Utah	Utah	B.Y.U.
1945	A. K. Christensen	Utah	Utah	B.Y.U.
	G. Novak			
	V. M. Tanner			
	W. W. Tanner			
1946	A. K. Christensen	Utah	Millard	B.Y.U.
			Utah	
1947	A. K. Christensen	Utah	Beaver	B.Y.U.
	L. S. Miller	Utah	Utah	B.Y.U.
	A. M. Woodbury	Utah	S.L.	U. of U.
1948	D. M. Allred	Utah	Millard	B.Y.U.

	W. W. Tanner	Utah	Utah	B.Y.U.
1949	D. M. Allred	Utah	Millard	B.Y.U.
	C. Berdall			
	D. B. Skousen			
	L. Heyrand	Utah	Tooele	U. of U.
	S. Smith			
	C. W. Lockerbie	Utah	Juab	U. of U.
	D. D. Parker	Utah	Juab	B.Y.U.
			Millard	
			Tooele	
	V. M. Tanner	Utah	Juab	B.Y.U.
			Millard	
	W. W. Tanner	Utah	Utah	B.Y.U.
1950	E. Averill	Utah	S.L.	U. of U.
	G. S. Bigler			
	L. E. Bitner			
	N. R. Christensen			
	C. D. Johnson			
	G. N. Taylor			
	W. Woodbury			
	D E. Beck	Utah	Beaver	B.Y.U.
			Juab	
			Millard	
	H. Goldschmidt	Calif.	S.B.	B.Y.U.
	R. Hansen	Utah	Tooele	U. of U.
	F. Jensen			
	A. C. Winslow			
	R. Liechty	Utah	Beaver	B.Y.U.
	J. L. Munyon	Utah	Juab	B.Y.U.
	V. M. Tanner	Nev.	Nye	B.Y.U.
			W.P.	
		Utah	Beaver	
			Millard	
			Tooele	
			Utah	
	W. W. Tanner	Nev.	W.P.	B.Y.U.
		Utah	Juab	
			Utah	
1951	D E. Beck	Utah	Juab	B.Y.U.
	V. M Tanner	Nev.	Nye	B Y.U.
		Utah	Millard	
1952	D E. Beck	Utah	Sanpete	B.Y.U.
	M. Coffee	Utah	Sevier	B.Y U.
	M. Killpack	Utah	Millard	B.Y.U.
	A. H. Kopp	Utah	Utah	B.Y.U.
	W W. Tanner	Utah	Iron	B.Y.U.
1953	D E. Beck	Utah	Millard	B.Y.U.
			Iron	
			Juab	

1953	J. F. Howell	Utah	Utah	B.Y.U.
	M. Killpack	Utah	Rich	B.Y.U.
	G. F. Knowlton	Utah	Tooele	B.Y.U.
1954	D. Bringhurst	Utah	Utah	B.Y.U.
	G. Tregaskis			
	J. F. Howell	Utah	Juab	B.Y.U.
	R. D. Sperry	Utah	Sevier	B.Y.U.
			Utah	
	L. A. Swanson	Utah	Sevier	B.Y.U.
	W. W. Tanner			
1955	K. Bacon	Utah	Millard	B.Y.U.
	D. C. Chester	Utah	Sevier	B.Y.U.
	D. H. Curtis			
	D. Mumford			
	R. Pursely			
	L. Stevens			
	C. Taylor			
	V. J. Cox	Utah	Tooele	B.Y.U.
	D. Hansen	Utah	Beaver	B.Y.U.
			Utah	
	W. W. Tanner	Utah	Beaver	B.Y.U.
			Sevier	
			Utah	
1956	R. B. Loomis	Calif.	L.A.	B.Y.U.
	W. W. Tanner	Utah	Utah	B.Y.U.
	R. Taylor			
	W. G. Robison	Utah	Tooele	B.Y.U.
	D. D. Parker	Utah	Utah	B.Y.U.
1957	J. Smith	Utah	Summit	U. of U.
	W. W. Tanner	Utah	Utah	B.Y.U.
	J. W. Twente	Utah	Box Elder	U. of U.
			Sevier	
			Tooele	
1958	J. C. Bowman	Utah	Utah	B.Y.U.
	S. G. Hansen	Nev.	Nye	B.Y.U.
	W. G. Robison	Utah	Utah	B.Y.U.
	W. W. Tanner	Utah	Utah	B.Y.U.
	D. D. LaMare	Utah	Utah	B.Y.U.
1959	D. M. Allred	Nev.	Nye	B.Y.U.
	D E. Beck			
	W. W. Tanner	Utah	Millard	B.Y.U.
	A. Hansen	Utah	Sanpete	B.Y.U.
1960	D E. Beck	Utah	Juab	B.Y.U.
	W. W. Tanner	Nev.	Churchill	B.Y.U.
		Utah	S.L.	B.Y.U.
	J. Harmon	Utah	Sanpete	B.Y.U.
	J. E. Kuda	Utah	Utah	B.Y.U.
1961	D E. Beck	Calif.	Inyo	B.Y.U.
	D. M. Allred	Nev.	Nye	B.Y.U.

1961	D E. Beck C. D. Jorgensen W. W. Tanner	Nev.	Nye	B.Y.U.
1962	D. M. Allred D E. Beck C. D. Jorgensen W. W. Tanner	Nev.	Nye	B.Y.U.
1963	C. D. Jorgensen J. R. Lannon	Nev.	Nye	B.Y.U.

Localities

Great Basin localities represented by reptile specimens in the collections of Brigham Young University and the University of Utah are listed below. Altitudes were determined when possible. An asterisk (*) before the elevation on the accompanying list indicates that the elevation is of the nearest town and not the exact locality represented by the specimen sample. The following were used in the determination of geographic data for this list: Davis (1939), Durrant (1952), Federal Writers Project (1950), Gannett (1900, 1906), Hubbs and Miller (1948), and Woodbury (1952).

ALPHABETICAL INDEX OF LOCALITIES REPRESENTED BY REPTILE SPECIMENS IN THE COLLECTIONS OF BRIGHAM YOUNG UNIVERSITY AND UNIVERSITY OF UTAH

State	*County*	*Specific locality*	*Elevation*
Calif.	Inyo	Oasis	
Calif.	Inyo	Panamint Sphrs., E	
Calif.	L.A.	Llano, 3 mi E	3169
Calif.	L.A.	Littlerock, 2 mi E	2910
Calif.	L.A.	Palmdale	2664
Calif.	S.B.	Cajon Pass	4011
Calif.	S.B.	Baker	920
Ida.	Bannock	Jump Cr.	
Ida.	Bannock	Lava Hot Sprs.	
Ida.	Bannock	Swan L.	
Ida.	B. L.	Deep L.	
Ida.	B. L.	Paris	
Ida.	Cassia	Birch Cr.	
Ida.	Cassia	Oakley	
Ida.	Cassia	Shoshone Falls	
Ida.	Franklin	Clifton	
Ida.	Franklin	Clifton Cr.	
Ida.	Franklin	Preston	
Nev.	Churchill	90 mi E Fallon	
Nev.	Elko	Lyman Sprs.	
Nev.	Elko	Wells, 20 mi E	5525*
Nev.	Humboldt	Winnemucca, 28 mi. E	4324*4
Nev.	Lander	Battle Mountain	4507

4 An asterisk (*) after the elevation indicates that the elevation is of the nearest town and not of the exact locality.

Nev.	Lyon	Fernley	
Nev.	Nye	Cherry Cr.	
Nev.	Nye	Currant, 35 mi SW	
Nev.	Nye	Locke's	
Nev.	Nye	Nuclear Test Site, Mercury	
Nev.	Nye	Sunnyside	
Nev.	Nye	Sunnyside, 19 mi S	
Nev.	Washoe	Pyramid L.	
Nev.	Washoe	Wadsworth	
Nev.	W. P.	Big Spr.	
Nev.	W. P.	Hot Cr. Spr.	
Nev.	W. P.	Lehman Cave NM	
Nev.	W. P.	Lund, & 1 mi E	
Nev.	W. P.	Mt. Wheeler	
Nev.	W. P.	Preston	
Nev.	W. P.	Sacramento Pass	7154
Nev.	W. P.	Saw Mill Cn.	
Utah	Beaver	Beaver	5970
Utah	Beaver	Beaver, 12.3 mi W	5970*
Utah	Beaver	Milford	4958
Utah	Beaver	Milford V., between Milford & Minersville	
Utah	Beaver	Minersville	5625
Utah	Beaver	Minersville Dam	5625*
Utah	Beaver	Sulphurdale	5625
Utah	Beaver	Wah Wah Spr.	
Utah	Beaver	W portion of county	
Utah	Beaver	Wildcat, 10 mi S Cove Ft.	
Utah	Box Elder	Bear R.	4215
Utah	Box Elder	Bird Id.	
Utah	Box Elder	Blue Ridge Mtns.	
Utah	Box Elder	Brigham	4307
Utah	Box Elder	Chesapeake Gun Club	4215
Utah	Box Elder	Como Spr.	
Utah	Box Elder	Corrine, 6 mi W & 12 mi N	4229*
Utah	Box Elder	Dolphin Id.	
Utah	Box Elder	Grouse Cr. Mtns., Rosebud Cr.	
Utah	Box Elder	Hansel V.	4200-5000
Utah	Box Elder	Locomotive Spr.	4400
Utah	Box Elder	Patterson Pass	
Utah	Box Elder	Raft R. Mtns., Roseverse Cr.	
Utah	Box Elder	Saline, 5 mi E	4217*
Utah	Box Elder	Snowville	4544
Utah	Box Elder	Tacoma Mtns., Lucin	4475
Utah	Box Elder	Tremonton	4315
Utah	Cache	Dry L.	5600
Utah	Cache	Logan	4535
Utah	Cache	Logan Cn.	
Utah	Cache	Smithfield	4450
Utah	Cache	Tony Cr.	
Utah	Cache	Wellsville	5000
Utah	Cache	Wellsville Cn.	
Utah	Davis	Bountiful	4398
Utah	Davis	Bountiful, cn. E	
Utah	Davis	Clearfield	4487
Utah	Davis	Farmington	4200
Utah	Davis	Farmington Bay	
Utah	Davis	Kaysville	4344
Utah	Davis	Phillips Oil Refinery	4253
Utah	Davis	Ward Cn.	

Utah	Davis	Woods Cross	4292
Utah	Garfield	Bryce Cn. NP	
Utah	Garfield	Panguitch	
Utah	Iron	Cedar Brakes NM	
Utah	Iron	Cedar City	5834
Utah	Iron	Cedar City Cn.	
Utah	Iron	Iron City	
Utah	Iron	Ironton Ruins	
Utah	Iron	Kanarraville	5541
Utah	Iron	Lund	5082
Utah	Iron	Newcastle, ±4 mi S	
Utah	Iron	Parowan, 10 mi W	5990*
Utah	Iron	Summit on rd. between Paragonah & Parquitah	
Utah	Juab	Birch Cr. Cn.	5500
Utah	Juab	Callao	4341
Utah	Juab	Callao, 10 mi SE	
Utah	Juab	Callao, 15 mi S	
Utah	Juab	Cherry Cr.	
Utah	Juab	Deep Cr. Mtns., Thomas Cr.	
Utah	Juab	Delta, 30 mi N	
Utah	Juab	Fish Spr.	5000
Utah	Juab	Fish Spr., 8 mi S	
Utah	Juab	Gandy Spr.	
Utah	Juab	Jericho	5309
Utah	Juab	Jericho, 3 mi N	
Utah	Juab	Levan	5163
Utah	Juab	Levan, 4 mi S	
Utah	Juab	Lynndyl, 10 mi N	4784*
Utah	Juab	Mammoth	6026
Utah	Juab	Nephi	5114
Utah	Juab	Salt Cr. Cn.	
Utah	Juab	Silver City, 2 mi S	6100*
Utah	Juab	Topaz Mtn., nr. Lynndyl	7110
Utah	Juab	Trout Cr.	4675
Utah	Juab	Yuba Dam	
Utah	Millard	Antelope Mtns., Antelope Spr.	6743
Utah	Millard	Black Rock	4852
Utah	Millard	Clear L.	4750
Utah	Millard	Cove Ft.	6000
Utah	Millard	Cove Ft., 3 mi N	
Utah	Millard	Cove Ft., 10 mi N	4649
Utah	Millard	Delta, 10 mi NW	
Utah	Millard	Delta	
Utah	Millard	Delta, 50 mi SW	
Utah	Millard	Deseret	4586
Utah	Millard	Desert Range Exp. Sta.	
Utah	Millard	Fillmore	5135
Utah	Millard	Fillmore Cn.	
Utah	Millard	Fillmore, craters w	
Utah	Millard	Fillmore, 15 mi NW (Devil's Kitchen)	
Utah	Millard	Gandy	5050
Utah	Millard	Hinckley, 15 mi S	
Utah	Millard	Horse Range, Margum Pass	6400
Utah	Millard	Iber	
Utah	Millard	Leamington, 7 mi N	4728*
Utah	Millard	Lynndyl	4785
Utah	Millard	Lynndyl, 6 mi N	
Utah	Millard	Notch Mtn., US Hwy 6	
Utah	Millard	Oak City	4700
Utah	Millard	Oak City, 2 mi W	

Utah	Millard	Oak City, 5 mi SW	
Utah	Millard	Oak Cr.	
Utah	Millard	White V.	4600-4900
Utah	Morgan	Como Spr.	
Utah	Morgan	Como Spr., E of	
Utah	Morgan	Morgan	5068
Utah	Piute	Black Cn.	
Utah	Piute	Circleville	
Utah	Piute	Kingston	
Utah	Piute	Marysvale	4125
Utah	Rich	Bear L.	5925
Utah	Rich	Woodruff Cr., W fk.	6344*
Utah	Rich	Woodruff Cr., N fk.	
Utah	S. L.	Alta	8585
Utah	S. L.	Antelope Id., 5 mi S	4203
Utah	S. L.	Brighton	8730
Utah	S. L.	City Cr. Cn.	
Utah	S. L.	Draper, 5 mi NE	4505
Utah	S. L.	Dry Cn.	
Utah	S. L.	Emigration Cn.	
Utah	S. L.	Ft. Douglas	
Utah	S. L.	Little Cottonwood Cn.	5200-9800
Utah	S. L.	Mill Cr. Cn.	4337
Utah	S. L.	Murray	
Utah	S. L.	Parley's Cn.	
Utah	S. L.	S. L. City	4253
Utah	S. L.	Sandy	4451
Utah	S. L.	Sandy, W & SE	
Utah	S. L.	Warm Spr.	
Utah	S. L.	White Pine L.	
Utah	Sanpete	Ephraim	5514
Utah	Sanpete	Ephraim, 2 mi NE	
Utah	Sanpete	Fairview	6023
Utah	Sanpete	Fountain Green	6026
Utah	Sanpete	Fountain Green, 3 mi N	
Utah	Sanpete	Gunnison, reservoir E	5750*
Utah	Sanpete	Indianola	5685
Utah	Sanpete	Manti	5552
Utah	Sanpete	Maple Cn.	4846-5750
Utah	Sanpete	Mayfield, 5 mi S	
Utah	Sanpete	Mt. Pleasant	
Utah	Sanpete	Spring City	5685
Utah	Sevier	Annabella	5250
Utah	Sevier	Aspene	
Utah	Sevier	Fish L.	8750
Utah	Sevier	Marysvale Cn.	5500-5800
Utah	Sevier	Richfield	5340
Utah	Sevier	Salina Cn.	5200-6500
Utah	Sevier	Sevier Cn.	6550-7000
Utah	Sevier	Sigurd	5220
Utah	Sevier	Sigurd, 8-9 mi SE & 9 mi E	
Utah	Sevier	Jct. Sigurd-Richfield rds. on way to Loa	
Utah	Summit	Coalville, 1½ mi NE	5572
Utah	Summit	Peoa	6191
Utah	Summit	Woodland	6806
Utah	Tooele	Benmore	5700
Utah	Tooele	Bunkhill Mine	
Utah	Tooele	Cedar Mtns.	

Utah	Tooele	Clover	5180
Utah	Tooele	Desert Mtns., 15 mi N Wendover	
Utah	Tooele	Dugway P Co's entrance	
Utah	Tooele	Dugway P Co	
Utah	Tooele	Fish Spr.	
Utah	Tooele	Gold Hill	
Utah	Tooele	Grantsville, W of	
Utah	Tooele	Grantsville, 4 mi N & 4 mi W	4304*
Utah	Tooele	Ibapah	5288
Utah	Tooele	Ibapah, 15 mi N	
Utah	Tooele	Indian Spr.	5284
Utah	Tooele	Knolls	4253
Utah	Tooele	Low	4604
Utah	Tooele	Menile	
Utah	Tooele	New Stansbury Id.	4202
Utah	Tooele	Ophir, 3 mi W	6498
Utah	Tooele	Between Ophir & Mercur	
Utah	Tooele	Rush Valley	5000-5500
Utah	Tooele	Salt Spr.	4350
Utah	Tooele	Skull Valley	4250-4750
Utah	Tooele	Skull Valley, N end	
Utah	Tooele	Stansbury Mtns., E Dugway entrance	
Utah	Tooele	Stockton	5069
Utah	Tooele	Stockton, 3 mi SE	
Utah	Tooele	Tooele V.	4250-4500
Utah	Tooele	Vernon, Lookout Pass	5511*
Utah	Tooele	Wendover, 2 mi NW & 3 mi E	4246*
Utah	Tooele	Willow Spr.	
Utah	Tooele	Willow Spr., 3 mi W	
Utah	Utah	Altamount	4566
Utah	Utah	Alpine	4957
Utah	Utah	American Fk.	
Utah	Utah	American Fk. Cn.	
Utah	Utah	Benjamin	4546
Utah	Utah	Carterville	
Utah	Utah	Cedar Ft.	5250
Utah	Utah	Cedar Ft., 2 mi S	
Utah	Utah	Cedar V.	
Utah	Utah	Cedar V., W side	
Utah	Utah	Chimney Rock Pass	4500-5000
Utah	Utah	Diamond Fk. Cn.	
Utah	Utah	Dividend	6250
Utah	Utah	Elberta	4664
Utah	Utah	Elberta, 2 mi W	
Utah	Utah	Elberta, 3 mi N (Meseda Bend)	
Utah	Utah	Fairfield	4876
Utah	Utah	Goshen	4531
Utah	Utah	Goshen, 6 mi N	
Utah	Utah	Grove Cr.	
Utah	Utah	Hobble Cr. Cn.	
Utah	Utah	Homansville	6232
Utah	Utah	Lake Mtns., Eureka	
Utah	Utah	Lake Mtns., Tintic	6750
Utah	Utah	Lake Mtn., Utah L.	
Utah	Utah	Lehi	4562
Utah	Utah	Lehi, foothills N	
Utah	Utah	Lehi, 5 mi W	
Utah	Utah	Lehi, 10 mi W	
Utah	Utah	Mercur (canyon above)	
Utah	Utah	Mt. Timpanogos, Aspen Grove	6800

Utah	Utah	Nebo Cn.	
Utah	Utah	Oquirrh Mtns., West Cn.	
Utah	Utah	Orem	4760
Utah	Utah	Payson	4605
Utah	Utah	Pleasant Grove	4557
Utah	Utah	Pleasant Grove Cn.	4557-4750
Utah	Utah	Pole Cn.	
Utah	Utah	Provo	4553
Utah	Utah	Provo Cn.	
Utah	Utah	Richmond, 9 mi S	
Utah	Utah	Rock Cn.	
Utah	Utah	Santaquin, W	4761
Utah	Utah	Saratoga, 5 mi W	
Utah	Utah	Spanish Fk.	4750
Utah	Utah	Spanish Fk. Cn.	4750-5000
Utah	Utah	Springville	4600
Utah	Utah	Sunshine Cn.	
Utah	Utah	Thistle	5052
Utah	Utah	Thistle, 3 mi E	
Utah	Utah	Thistle, 9 mi S	
Utah	Utah	Thistle Cn.	
Utah	Utah	Timpanogos Cave Trail	4750-7750
Utah	Utah	Utah L., W	4489
Utah	Utah	Utah L., Pelican Pt.	
Utah	Utah	Utah L., Powell's Slough	
Utah	Utah	Utah L., Provo Bay	
Utah	Utah	West Cn. (cabins)	
Utah	Utah	West Cn. S Fk.	
Utah	Wasatch	Charleston	5433
Utah	Wasatch	Lake Cr. Cn.	6250*
Utah	Wasatch	Wallsburg	5300
Utah	Washington	Blue Sprs.	
Utah	Washington	Pinto	
Utah	Weber	Farr West	4244
Utah	Weber	Ogden	
Utah	Weber	Ogden Cr.	4288-4815

Species Account

Sauria

Family Eublepharidae

Genus *Coleonyx* Gray

Coleonyx variegatus utahensis Klauber

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17926-9, 17931, 17987, 18812).

Variation—Females attain a larger snout-vent length than males [♀ 12 (61.6) 44-70; ♂ 16 (54.13) 37-66].[5] Males, of course, possess developed anal pores [♂ 16 (5.87) 4-8], whereas these structures are not developed to be detectible in females. In our sample there are more postmentals in males than in females [♂ 16 (5.75) 3-7; ♀ 12 (5.5) 3-8].

The dorsal color pattern is variable with most specimens having a pattern similar to specimens from the type locality (St. George,

5. Number (mean) range. This sequence will be used throughout.

Utah). However, some are similar to or show indications of intergradation with *v. variegatus.*

Remarks—Tanner and Jorgensen (1963) extend the range of the Utah subspecies into southern Nye County, Nevada, and suggest that intergradation should be expected in western Nye County or in adjoining California. Inasmuch as these subspecies are largely determined by color pattern, and since the geographical and habitat of this area is rather uniform, it is expected that the area of intergradation may be wider than has been indicated in previous studies of Klauber (1945).

Family Iguanidae

Genus *Dipsosaurus* Hallowell

Dipsosaurus dorsalis dorsalis Hallowell

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17943, 18813-4).

Variation—The above three specimens are females. The snout-vent lengths ranged from 97 to 122 with a mean of 110. Femoral pore counts ranged from 39 to 42 with a mean of 40.66. Ventrals, counted medially, ranged from 89 to 99 with a mean of 93.66. Dorsals ranged from 87 to 95 with a mean of 89. Two of the specimens have regenerated tails.

Remarks—The Northern Crested Lizard does not enter the Great Basin in Utah and in Nevada reaches only the extreme southeastern edge of the basin in Nye County.

We concur with Stebbins (1954) that this lizard is usually found in areas where the creosote bush is a part of the desert community. However, the altitude of 3,200 feet reported for the Providence Mountains should not be considered as the maximum altitude for this species in Nevada. On the basis of the sight record from Cane Springs (NTS) we believe that this species ranges from the flats up to at least 3,500 feet, on the western slopes of the Frenchman Flat basin.

Genus *Crotaphytus* Holbrook

Crotaphytus collaris baileyi Stejneger

Material Examined—Calif.: Inyo Co., E Panamint Sprs. (B.Y.U. 18055).

Nev.: Nye Co., NTS, Mercury (B.Y.U. 17275, 17940-2, 18815-6, plus nine uncatalogued specimens).

Utah: Tooele Co., Gold Hill (B.Y.U. 4305-6, U. of U. 39), New Stansbury Id. (U. of U. 491), Low (U. of U. 931-2), Wendover, 3 mi E (U. of U. 33554, 33596), Desert Mtns. 15 mi N, 13 mi E Wendover (U. of U. 3274), Dugway PG (B.Y.U. 14818, 14822, 14854, U. of U. 3388, 3391-3). Utah Co., Lake Mtns. (B.Y.U. 552, 1628, 1630-2), Santaquin (U. of U. 2038), Chimney Rock Pass (B.Y.U. 2844, 14689), Cedar V. (B.Y.U. 450, 1466, 1460, 1455).

Juab Co., Trout Cr. (U. of U. 1214-5). Topaz Mtn. (B.Y.U. 9069). Millard Co., Desert Range Exp. Sta. (U. of U. 2802), Fillmore (B.Y.U. 8753, 8755, 4309, 12946), Antelope Sprs. (B.Y.U. 449, 1447), 15 mi S Hinckley (B.Y.U. 4310), Oak City (B.Y.U. 447), Deseret (B.Y.U. 448), Cowboy Pass, 6 mi W Delta (B.Y.U. 21703), 10 mi NW Delta (B.Y.U. 8883), Lynndyl (B.Y.U. 445). Beaver Co., W portion (B.Y.U. 12715-6).

VARIATION—Males attain a greater snout-vent length than females in the samples examined [♂ 22 (89.4) 49-104; ♀ 21 (79.52) 50-92]. Females seem to have a slightly larger number of dorsal scales [♂ 22 (164.2) 140-179; ♀ 21 (166) 157-175]. There is very little sexual dimorphism exhibited by femoral pore counts [♂ 21 (33.9) 29-39; ♀ 21 (34) 30-38].

REMARKS—The fact that populations of *C. collaris* have a much more extensive distribution than *C. wislizeni* outside of the Great Basin suggests that *collaris* is the older of the two species. Populations of *C. collaris* extend farther east onto the western prairie areas at the present time. They occur in areas which receive more precipitation than do any of the Great Basin valleys or foothills at the present time. This would tend to suggest that populations of *collaris* may have survived in the most moist situations of the Pluvial Periods in the Great Basin.

Crotaphytus wislizenii Baird and Girard

MATERIAL EXAMINED—NEV.: Lander Co., Battle Mtn. (B.Y.U. 2918). Nye Co., NTS, Mercury (B.Y.U. 17276-9, 17308-22, 17944, 18969, 18984, 21740-21755). Washoe Co., Pyramid L. (U. of U. 1672). W. P. Co., Lehman Caves NM (B.Y.U. 558.

UTAH: Tooele Co., Stansbury Mtns. (B.Y.U. 14688), Willow Sprs. (U. of U. 3562), Cedar Ridge (U. of U. 315), 2 mi NW Wendover (U. of U. 33599), Skull V. (U. of U. 51, 843a-g, 843i, 1221a, 1222a, 1223a, 33598), Cedar Mtns. (U. of U. 364, 644), 15 mi N Ibapah (B.Y.U. 480, 1555), Dugway PG (B.Y.U. 14843-14853). S. L. Co., Sandy (U. of U. 18). Utah Co., 6 mi N Goshen (B.Y.U. 576, 2210-1, 8496, 12196, 14690-1), Goshen (B.Y.U. 483, 1633, 2019-2021), W side Utah L. (U. of U. 1-4, 2a, 3563-7), Elberta (B.Y.U. 21506). Juab Co., 10 mi N Lynndyl (B.Y.U. 2731, 3020, 3027), Trout Cr. (B.Y.U. 11296, 1216), 3 mi N Jericho (B.Y.U. 10244, 12496), Fish Spr. (B.Y.U. 11295). Millard Co., Desert Range Exp. Sta. (U. of U. 2803-4, B.Y.U. 580, 4302, 11349), 5 mi SW Oak City (B.Y.U. 11354), 2 mi W Oak City (U. of U. 3298-3301), 10 mi N Cove Ft. (B.Y.U. 481), Devil's Kitchen (B.Y.U. 9099). Beaver Co., Minersville Dam (B.Y.U. 12001-2). Iron Co., Cedar City (B.Y.U. 478), Ironton ruins (U. of U. 1659), Lund (B.Y.U. 2371, 2374, 2376-7, 2899).

VARIATION—In contrast to *C. collaris baileyi*, female *C. wislizeni* attain a longer mean size than do males (42 males have a mean snout-vent length of 80.14, whereas 38 females have a mean of 86.24 mm.). There is only a slight difference in femoral pores for

males and females in the material examined. Females seem to have a larger number of dorsal scales than males [♂ 42 (193.6) 180-206; ♀ 38 (196.7) 180-213]. Ventral scales, counted medially, are also slightly higher in females [♂ 42 (100.2) 90-112; ♀ 36 (102.08) 90-117].

Specimens from the Nevada Test Site have slightly greater snout-vent lengths [♂ 12 (81.64) 46-119; ♀ 18 (96.83) 79-125]. Femoral pores in females from the NTS specimens were also slightly more than in samples from western Utah [♂ 14 (39.21) 36-43; ♀ 19 (40.58) 37-45]. There are only slight differences in the mean of the postmentals in the NTS and western Utah samples:

Utah ♂ 27 (4.15) 2-6; ♀ 22 (3.95) 3-6
Nevada ♂ 14 (4.43) 2-6; ♀ 19 (3.94) 2-7

Remarks—Existing populations of *C. wislizeni* occur in many of the valleys of the northern and western Great Basin. In many cases this species occurs in pinyon-juniper areas of the foothills of the larger mountain ranges. However, it is primarily found in the valleys, many of which were inundated by water during the Pluvial periods.

Whether populations of this species could have existed in the northern Great Basin during the various Pluvial periods poses an interesting and speculative problem. Its present wide distribution suggests that it may have survived in somewhat moister situations and possibly has become restricted in its distribution to the foothill areas adjacent to some of the Pluvial lakes; or it may have more recently migrated northward from areas in the southwestern United States, western Mexico, and Baja California where populations still exist.

Genus *Sauromalus* Dumeril

Sauromalus obesus obesus Baird

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17273-4, 17434-35, 20778-80, 2138).

Calif.: Inyo Co., Sleeping Sprs. Mt. (B.Y.U. 20777); S. B. Co., 50 mi N Barstow near Fort Erwin (B.Y.U. 21031-2).

Variation—The present series does not differ to that presented by Tanner and Jorgensen (1963).

Remarks—Although chuckwallas inhabit the rocky foothills and mountains of the southwestern deserts, they do not ascend to the Pinyon-Juniper biotic communities. We therefore believe that this species is also one which has entered these more northern valleys in post-Pluvial times.

Genus *Callisaurus* Blainville

Callisaurus draconoides rhodosticus Cope

Material Examined—Nev.: Nye Co., Nuclear Test Site, near Mercury (B.Y.U. 17413, 16323-33, 20781-83, 17915-6, 20784-20805).

Variation—In the above samples males attain a longer mean snout-vent length than females [♂ 13 (68.8) 31-89; ♀ 24 (61.6) 33-80]. Leg lengths are also longer in males than in females [♂ 13 (65.4) 31-85; ♀ 24 (61) 32-78]. Males have much longer tails than females [♂ 8 (104.5) 86-122; ♀ 16 (86.5) 54-104]. Ventral scale counts and femoral pores show no conspicuous differences in the sexes.

Remarks—Although populations of lizards of this species occur in the southern and western Great Basin, they do not seem to occur in the Bonneville Basin. There is need for further sampling in the Escalante Desert area in the southeastern Great Basin to verify this point. As has been already stated by one of us (Banta 1963a) the occurrence of *Callisaurus* in the Lahontan Basin in the western Great Basin is probably a post-Pluvial phenomenon.

Genus *Sceloporus* Wiegmann

Sceloporus magister uniformis Phelan and Brattstrom

Material Examined—Calif.: L. A. Co., 2 mi E Littlerock (B.Y.U. 13175); Llano (B.Y.U. 15074-15079).

Nev.: Nye Co., NTS, Mercury (B.Y.U. 17420-33, 18982-3, 20805-14).

Variation—Smith (1939) noted that "there is no geographical correlation in the . . . variational data. Extremes or near extremes are found in all parts of the range of *magister* . . ." Phelan and Brattstrom (1955) and Tanner (1956) have found sufficient differences in some characteristics to warrant the designation of subspecific categories for several populations in and adjacent to the southern and western portions of the Great Basin.

Males have a greater snout-vent length than females [♂ 11 (92.09) 67-104; ♀ 15 (84.73) 47-100]. Femoral pores show only slight differences in the sexes [♂ 11 (25.8) 22-31; ♀ 15 (25.4) 23-28]. Dorsal scales also show slight sexual differences [♂ 11 (32.73) 30-36; ♀ 15 (33.6) 31-36], as is likewise the case with ventrals [♂ 11 (39.81) 36-43; ♀ 15 (39.4) 36-43]. There seem to be no obvious differences between our limited samples from California and Nevada.

Remarks—Populations of this species occur in the Mojave Desert of southeastern California and adjacent Nevada and extend northward into the basin of pluvial Lake Lahontan. It is not yet established whether this species occurs in the Escalante Desert of the southern Bonneville Basin. The higher elevations and more mesic areas (piñon-juniper) separating the southern Bonneville Basin from the Virgin River drainage may have prevented the establishment of populations there.

Sceloporus undulatus elongatus Stejneger

Material Examined—Utah: Sevier Co. Sigurd, 9.5 mi SE (B.Y.U. 12717), Mt. E Richfield (B.Y.U. 11840). Sanpete Co., Manti (B.Y.U. 1469, 14167).

Variation—The limited samples available at this time do not permit us to comment upon the relationships of this form to the *S. occidentalis* complex. Our samples are so limited that we can only list the meristic and morphometric data: Snout-vent length: ♂ 1 (61) 61; ♀ 2 (72.5) 70-25. Femoral pores: ♂ 1 (38) 38; ♀ 2 (31) 25-37. Dorsal scales: ♂ 1 (46) 46; ♀ 2 (52) 51-53. Ventral scales: ♂ 1 (53) 53; ♀ 2 (52.5) 49-56.

Remarks—The occurrence of populations of *S. undulatus elongatus* in only certain sections of the extreme limits of the eastern Bonneville Basin suggests that this species probably did not occur in the Bonneville Basin during the last Pluvial Period and populations are only now beginning to move from the Upper Colorado Basin into the more favorable areas provided since the drying up of Lake Bonneville.

The relationships between the *S. occidentalis* complex and *S. u. elongatus* need further study. We would suppose that *S. undulatus elongatus* is actually closer to *S. occidentalis* than to the more eastern North American populations of *S. undulatus*. Detailed color notes, behavioral observations, ecological preferences, and possibly comparisons of blood serum proteins by available techniques of microelectrophoresis might help in resolving this problem.

Sceloporus occidentalis longipes Baird

Material Examined—Nev.: Elko Co, Lyman Sprs. (B.Y.U. 10766-70). Nye Co., NTS, Mercury (B.Y.U. 17414-9, 18504, 18729-33, 20815-43, 20927). Douglas Co., 12 mi N State Line (B.Y.U. 16707).

Utah: Box Elder Co., Patterson Pass (B.Y.U. 11894-5); Tooele Co., Low (U. of U. 933-4), 3 mi W Ophir (U. of U. 2014, 2016, 2018), Dugway P G (B.Y.U. 14796, 14824-9, U of U. 3399-3400), 10 mi N Ibapah (U. of U. 2894), Gold Hill (U. of U. 784-5), Desert Mtns., 14 mi N and 12 mi E Wendover (U. of U. 3263-5). Utah Co., Chimney Rock Pass (B.Y.U. 2201-9, 2839), Sunshine Cn. (B.Y.U. 411), Elberta (B.Y.U 21711, 21720, 21722, 21577-9 and 21983-4), 7 mi W Elberta (B.Y.U. 21915, 22141, 22146), Geneva slag pile (B.Y.U. 16656). Juab Co., Deep Cr. Mtns., Thomas Cr. (B.Y.U. 11297). Millard Co, Desert Range Exp Sta. (B.Y.U. 8314). Washington Co., 4 mi N Central (B.Y.U. 12191). Beaver Co., 4 mi W Milford (B.Y.U. 21035, 21037, 21934).

Variation—Bell (1954) resurrected the name *S. o. longipes* for Great Basin populations. Although some authors (e.g., Norris 1958) have not recognized the validity of this designation, we believe Great Basin populations are sufficiently distinct, based on meristic and color pattern characteristics (Banta 1965) from populations occurring in southwestern California and northern Baja California, as to warrant such status.

Males attain a longer snout-vent length than females [♂ 10 (76) 69-83; ♀ 12 (72.33) 56-80]. Females have slightly more ventral scales than males [♀ 12 (55.09) 49-60; ♂ 8 (53.24) 52-56].

Femoral pores show little sexual dimorphism [♂ 8 (31) 28-33; ♀ 12 (30.5) 27-36], as is likewise the case with dorsal scales [♂ 8 (44.5) 43-46; ♀ 11 (44) 41-46]. The ventral color pattern of live lizards is distinct when compared with other *Sceloporus* from the Great Basin and particularly those occurring in the Bonneville Basin. A single median blue throat spot and a yellowish-orange color on the legs and edges of the abdomen are peculiar to this species.

Sceloporus graciosus graciosus Baird and Girard

Material Examined—Ida.: Cassia Co., Oakley (B.Y.U. 434, 1424).

Nev.: Elko Co., 20 mi E Wells (B.Y.U. 420, 1803). W. P. Co., Lehman Caves (B.Y.U. 645, 1802; Big Sp., Preston (B.Y.U. 9947), Sacramento Pass (B.Y.U. 9754-62), Hot Cr. Sprs. (B.Y.U. 9814), Ely (B.Y.U. 18175 and 18253). Nye Co., Pahute Mesa, NTS (B.Y.U. 22222-4).

Utah: Cache Co., Wellsville Cn. (B.Y.U. 11910-15). Box Elder Co., Patterson Pass (B.Y.U. 10348-54), Raft R. Mtns., Rosevere Cr. (B.Y.U. 435, 1420, 1422). Rich Co., N fk. Woodruff Cr. (B.Y.U. 12629-30). S. L. Co., City Cr. Cn. (U. of U. 672). Utah Co., Provo Bench (B.Y.U. 426, 1401-5, 1407, 1409-10, 1417, 1786-7, 11814-5), West Cn. (B.Y.U. 2241-6, 2851, 13239), Aspen Gr. (B.Y.U. 2825, 3940-1), Grove Cr. (B.Y.U. 594, 1891-4), 4 mi SW Lehi (B.Y.U. 2787, 4323-7), Payson (B.Y.U. 427), Spanish Fk. Cn. (B.Y.U. 431, 1413, 1415-6), Oquirrh Mtns., West Cn. (B.Y.U. 643), Cedar V. (B.Y.U. 4186-8), Diamond Fk. Cn. (B.Y.U. 422). Tooele Co., Mercur (B.Y.U. 20976), 4 mi S Tooele (B.Y.U. 23574). Juab Co., Yuba Dam (B.Y.U. 12887), 10 mi N Lynndyl (B.Y.U. 2730, 3019, 11872, 11880-2), Cherry Cr. (B.Y.U. 9060-2), Mammoth (B.Y.U. 11839). Sanpete Co., Maple Cn. (U. of U. 513), Ephraim (U. of U. 627-30), Indianola (B.Y.U. 11933-4), Fairview (B.Y.U. 2270-1, 2860). Sevier Co., Salina Cn. (U. of U. 1736-8). Richfield (U. of U. 787-90, B.Y.U. 11841-3). 8 mi SE Sigurd (B.Y.U. 12621, 12702-4). Millard Co., Lynndyl (B.Y.U. 3691, 3693-4), Cove Ft. (B.Y.U. 2037-8, 2717), Fillmore Cn. (U. of U. 2413-9, B.Y.U. 11942-3 and 16560). Antelope Sprs. (B.Y.U. 430, 1411-2, 1414, 1418), 15 mi NW Fillmore (B.Y.U. 11937, 11939-41). Beaver Co., Wildcat (B.Y.U. 9768, 9771, 9773-4). Garfield Co. Bryce Cn NP (B.Y.U. 644, 1406), Hatch (U. of U. 236, 351, 928, 1352, 1715, 1739, 2009-15, 2248, 2266, 2269, 2273, 2276, 2281, 2285, 2312-22, 2714, 3095, 3102, 3224-5, 3235-6, and 3305-8). Piute Co., Marysvale (B.Y.U. 439, 11837).

Variation—There seems to be only slight differences in snout-vent length for males and females [♂ 92 (48.77) 26-62; ♀ 86 (48.9) 26-68]. Femoral pore counts are slightly higher in females [♂ 91 (25.9) 21-30; ♀ 82 (26.4) 22-32] Dorsal scales are also similar in number in the sexes [♂ 89 (48.5) 43-56; ♀ 87 (48.25) 37-57], and the same situation applies to ventrals [♂ 88 (54.9) 46-62; ♀ 78 (54.2) 49-61]. We can conclude from these figures that sexual

dimorphism is not as highly developed in the scale patterns in *S. graciosus* as it is in most other iguanid lizards occurring in the Great Basin.

Remarks—The present distribution of *S. graciosus*, which is widespread in the entire Bonneville Basin, including the area formerly inundated by Pluvial Lake Bonneville, relates the movements of the populations from above the lake level in Pluvial times to lower elevations at the present time.

The ecological distribution is also more extensive than that for most other Great Basin genera (except *Eumeces* and *Phynosoma*). Sagebrush lizards occur altitudinally from the desert flats well into the higher Juniper-Pinyon Pine and oakbrush habitats. They are known to reach elevations above 7,000 feet.

Genus *Uta* Baird and Girard

Uta stansburiana stansburiana Baird and Girard

Material Examined—Nev.: Elko Co., Lyman Sprs. (B.Y.U. 8305). Nye Co., 19 mi S Sunnyside (B.Y.U. 9783-7), NTS, Mercury (B.Y.U. 17282-17307, 17331, 17462-17562, 17912-17914, 18973-18976, 18986-18989, 20869-20926). W. P. Co., Lehman Cave (B.Y.U. 614).

Utah: Box Elder Co., Locomotive Sprs. (U. of U. 1684-6), Dolphin Id. (U. of U. 1742-3); Grouse Cr. Mtns., Rosebud Cr. (B.Y.U. 492), Lucin (B.Y.U. 493, 1558-9) 6 mi W, 12 mi N Corrina (U. of U. 3248). Tooele Co., Salt Spr. (U. of U. 199), Low (U. of U. 938); Willow Sprs. (U. of U. 674-6, 2348), 4 mi W Grantsville (U. of U. 1996-9, 2008), Ibapah (B.Y.U. 490, 1565-8), Gold Hill (U. of U. 461-471a-b, B.Y.U. 4193-4, 10188-91), Skull V. (U. of U. 1225, 938a, 638, 638b), Indian Sprs. (B.Y.U. 10054-6), Fish Spr. (B.Y.U. 9316-9), Dugway P G (U. of U. 3407-8), near Johnson's Pass, Stansbury Mtns. (U. of U. 746-9), W side Great Salt L. (U. of U. 1717-8), Stansbury Id. (U. of U. 1747, 2328-30), Skull V., W side, 2 mi S Orr's Ranch (U. of U. 527-534). Cedar Mtns. (U. of U. 501-4). S. L. Co., S. L. City (U. of U 858a, B.Y.U. 2921, 3516-8). Utah Co., 2 mi W Elberta (U. of U. 713-5), Lake Mtns. (U. of U. 2335-6, 2350-1, 2323-7), 3 mi N Elberta (B.Y.U. 8197-8200, 8325, 8790, 10374-7), 2 mi W Elberta (U. of U. 713-5), Provo (B.Y.U. 616, 1690-1), Chimney Rock Pass (U. of U. 2039-68, B.Y.U. 2837, 8488, 9839, 12197, 2199-2200, 2215), Sunshine Cn. (B Y.U. 436), Payson (B.Y.U. 1018, 9793), 4 mi SW Lehi (B Y.U. 621, 2078, 2785, 4185, 8794, 8938-40), Pelican Pt., W side Utah L. (U. of U. 505, 615-621). Juab Co., Gandy Spr. (B.Y.U. 9296-9306), Yuba Dam (B.Y.U. 9820, 11505-7) Lynndyl (B Y.U. 9063-66), Trout Cr. (B.Y.U. 9307-13), Cherry Cr. (B.Y.U. 3314-5), Callao (B.Y.U. 494, 1560, 9323). Sevier Co., Richfield (U. of U. 58-9), Salina Cn. (U. of U. 1724-35). Millard Co., Desert Range Exp. Sta. (U. of U. 2806), Margum Pass (B.Y.U. 9817-9, 11525-7), Lynndyl (B.Y.U. 623, 10178, 12456), Delta (B.Y.U. 12933), 2 mi S, 2 mi W Oak City

(U. of U. 3302-4). Beaver Co., Beaver (B.Y.U. 10275), Wah Wah Spr. (B.Y.U. 11529-31).

Variation—Some aspects of the variation within populations of this species seem to be "clinal." Camp (1916) noted that the number or dorsal transverse scale rows increases from south to north. Parker (1951) made a study of populations of this form in western Utah and southern Nevada in an attempt to discern the boundary between the then recognized subspecies *stejnegeri* and *stansburiana*. He showed that the characters used to differentiate these two nomenclatural forms breaks down, and, although not stated specifically, Parker's data eliminates *stejnegeri* (Schmidt 1921) from the Great Basin fauna. The name *U. s. stejnegeri* should be restricted to populations inhabiting the Chihuahuan Desert of New Mexico, central and eastern Arizona and adjacent regions in Mexico, as has already been stated by Tanner and Jorgensen (1963).

Genus *Phrynosoma* Wiegmann

Phrynosoma douglassi ornatum Girard

Material Examined—Nev.: Washoe Co., Wadsworth (U. of U. 175). W. P. Co., Ely (B.Y.U. 18173-4, 18254).

Utah: Tooele Co., Rush V. (B.Y.U. 12711), Dugway P G (B.Y.U. 14841-2), Tooele V. (U. of U. 368, 368a, 205), near Stansbury Id. (B.Y.U. 11977-8). S. L. Co., S. L. City (U. of U. 858b, 1968, 57369a, B.Y.U. 11973-4, 11976), Emigration Cn. (U. of U. 2846). Ft. Douglas (B.Y.U. 2778, 2097, U. of U. 9, 374, 1969-70, 2306), no definite locality (U. of U. 126-9). Utah Co., Mt. Timpanogos (B.Y.U. 8051-3), Lehi (B.Y.U. 2786), Alpine (U. of U. 369), 5 mi SW Saratoga (B.Y.U. 15091), Utah L., W side (U. of U. 2263), Provo (B.Y.U. 3356, 8062), Hobble Cr. Cn. (B.Y.U. 13132). Millard Co., Desert Range Exp. Sta. (B.Y.U. 4331), Cove Ft. (B.Y.U. 8034). Juab Co., Eureka (B.Y.U. 8874), Fish Spr. (B.Y.U. 11979). Sanpete Co., Indianola (B.Y.U. 6032, 14788), Fairview (B.Y.U. 2859). Sevier Co., Fish L. (B.Y.U. 11221). Garfield Co., Bryce Cn. N P (B.Y.U. 1838, 8055, 11982, 14782). Washington Co., Blue Sprs. (B.Y.U. 3103).

Variation—The most recent review of the genus is that of Reeve (1952). Several of the morphological characters used to separate the various nominal varieties of *P. douglassi* are of questionable significance. The bordering of the dorsal spots posteriorly and mesially in a light color is a variable one suggesting clinal trends. At the present time we have not examined adequate samples of populations of this lizard to show the extent of variation within any one geographic area in the Great Basin.

Females have a greater mean snout-vent length than males [♀ 23 (66.9) 28-94; ♂ 11 (60.9) 39-88]. Femoral pores are only slightly greater in males than in females [♀ 33 (28.9) 20-33; ♂ 10 (29.8) 25-36], and there are only slight dimorphic differences in ventral scales [♀ 21 (68.9) 62-80; ♂ 9 (68.4) 61-76].

Remarks—Bell (1829) in the original description of *P. douglassi* remarked that these horned lizards are always found near water. Many of the distribution records are from higher elevations. Cockerell (1901) recorded a specimen of the related subspecies *hernandesi* collected at 10,000 feet in the Las Vegas Mountains in New Mexico. Specimens from Bryce Canyon National Park were taken from localities up to 9,000 feet.

From the available distribution records one could develop the hypothesis that populations of *P. douglassi* could have, and probably did, have a much more extensive distribution in the western Great Basin during the various moist periods of the Pleistocene. With the subsequent desiccation of the intermontane pluvial lakes and the incursion of more southern forms into the northern valleys, coupled with the climatic changes leading to the development of desert or semi-desert conditions, populations of *P. douglassi* have been and possibly still are continuing to retreat northward in the valleys and to the more humid environs afforded by the higher mountain ranges.

Phrynosoma platyrhinos platyrhinos Girard

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17436-17461, 18968, 18977-8, 18987, 20863-8), Warn Spr. (B.Y.U. 18053). Washoe Co., Wadsworth (U. of U. 803). W. P. Co.: Sunnyside (B.Y.U. 10535).

Utah: Box Elder Co., Lucin (B.Y.U. 13016). Tooele Co., Fish Spr. (B.Y.U. 9416, 12957), Cedar Mtns. (U. of U. 202), Tooele V. (U. of U. 440-2), Low (U. of U. 936), Gold Hill (B.Y.U. 14781, U. of U. 2119), Skull V., Willow Spr. (U. of U. 1224a), Skull V., 18 mi SW Orr's Ranch (U. of U. 2233), Cobblestone den, near Grantsville (U. of U. 2007, 2826, 2827a), Utah-Nev. line on rd. to Gold Hill and Ibapah (U. of U. 3058), Desert Mtns., 14 mi N and 9 mi E Wendover (U. of U. 3250-6), Desert Mtns., 15 mi N and 13 mi E Wendover (U. of U. 3271-3), Dugway PG, SE Camel Back (U. of U. 3403-5), Dugway PG, 2 mi W Cedar Mtn. (U. of U. 3409), Dugway PG, Whiskey Spr. Cn. (U. of U. 3406). Weber Co., Ogden (U. of U. 1699). Utah Co., Chimney Rock Pass (B.Y.U. 2838, 12557, U. of U. 2023-5, 2069-72, 2074), Blowhole country, W side Utah L. (U. of U. 2210-16). Juab Co., Yuba Dam (B.Y.U. 9956-7). Topaz Mtn. (B.Y.U. 9073). Millard Co., Iber (B.Y.U. 12679), Desert Range Expr. Sta. (B.Y.U. 12954, 12957), Gandy (B.Y.U. 9407), Delta (U. of U. 1937).

Variation—*Phrynosoma platyrhinos* occurs in the Great Basin, portions of Upper Colorado Basin of southeastern Utah, northern Arizona and the Colorado Basin of southeastern Utah, northern Arizona and the Colorado Desert of southern California and northeastern Baja California. The species complex, as it is now understood, suggests that the group as a whole is in need of review beyond that provided by Reeve (1952).

Utah samples show slight sexual differences in snout-vent length [♂ 19 (67.1) 52-79; ♀ 23 (67.8) 31-80], whereas in the Nevada

Test Site material the females are larger than the males [♂ 19 (63.57) 29-78; ♀ 13 (67.84) 35-87]. Femoral pore counts exhibit slight sexual differences in both the Utah and Nevada material:

Nevada ♂ 18 (17.66) 14-21; ♀ 13 (18.15) 16-21
Utah ♂ 20 (19.7) 16-24; ♀ 24 (18.66) 14-26

In Nevada specimens ventrals are noticeably higher in females than males [♀ 13 (85.54) 74-92; ♂ 19 (82.68) 74-90] but in Utah samples they are only slightly higher in males [♂ 20 (78.55) 68-88; ♀ 26 (77) 68-87].

Remarks—Bryant (1911) wrote that *P. platyrhinos* "is truly a desert species and is found in the most arid and barren places." Available records tend to support Bryant's statement, with modifications to the effect that populations also occur in areas that are not extremely arid. Populations of this lizard also exhibit a considerable altitudinal and latitudinal distribution. However, they do not seem to occur at such high elevations or in such moist situations as do populations of *P. douglassi*.

Reeve (1952) regarded *P. platyrhinos* as one of the oldest members of the genus. On the basis of an examination of the distributional records alone, Reeve's interpretation may be untenable. Morphologically, *P. platyrhinos* is a more complex form than *douglassi*. Combine the distributional data with that of morphology, with *douglassi* occurring in more moist areas and with far fewer expressions of development of the ornamentation of cephalic spines, and the conclusion that *douglassi* is more primitive than *platyrhinos* could be drawn. We are inclined to accept *platyrhinos* as the most specialized and aggressive horned lizard in the Great Basin.

Family Xantusidae

Genus *Xantusia* Baird

Xantusia vigilis vigilis Baird

Material Examined—Calif.: S. B. Co., Cajon Pass (B.Y.U. 2733, 3025, 3030-31, U. of U. 102, 104).

Nev.: Nye Co., NTS, Mercury (B.Y.U. 17932, 21760-21780).

Variation—Sexual dimorphism is not well developed and we did not reliably determine the sexes of the samples observed. Such a reliable sex determination would necessitate histological section of the gonads, and this was not done.

There are slight differences to be noted in the sample from Mercury, Nevada, in comparison to Cajon Pass, California. The California samples had a slightly larger mean dorsal scale count of 104 (N=6) in comparison to 100 81 (N=16) for Mercury. The ventral counts for the California samples were lower (28.66—N=6) than the Mercury samples (30.06—N=16). The mean snout-vent lengths of the California samples were larger (41—N=6) than the Mercury samples (35.5—N=20). It must be pointed out that these

are very tentative comparisons and a much more intensive examination of xantusiid material is necessary before more exact parameters of variation within the various populations can be determined.

Data available for the Washington County, Utah, population provides the following averages for dorsals (104.00), ventrals (29.12) and femoral pores (16.40). The slight variations suggest that the Great Basin populations of *X. vigilis* are similar throughout but with slight clinical variations appearing such as in femoral pores, Cajon Pass (14.83), Mercury (16.14) and SW Utah (16.40). Variations of additional characters of *Xantusia* are listed by Tanner (1957).

Remarks—Turner (1959) reported the collection of several specimens of this species from various elevations in the Panamint Mountains, Inyo County, California, ranging as high as 8,500 feet. Previously populations of *X. vigilis* were unknown from such high altitudes and the species was considered to be restricted to the Joshua tree covered alluvial fans and flaked granite outcrops of the lower mountain ranges. Turner's report opens up an entirely new aspect of the distribution of *X. vigilis*. On just what mountain ranges do populations occur? What is the actual extent of altitudinal variation of their distribution? Banta (1963b) has remarked upon the species' occurrence in the Inyo and Nelson Mountains of the Saline Valley hydrographic basin, Inyo County, in situations where Joshua trees are either nonexistent or greatly reduced.

The restriction of populations of this lizard to special moist situations either in decaying Joshua tree trunks or under debris at the higher elevations of the mountain ranges in the southwestern Great Basin suggests that the animal could have survived around the lake-filled basins during the various Pluvial periods. With the desiccation of the various lakes and the developing aridity, the lizard presumably retreated to the favorable situations afforded by Joshua trees and the higher elevations of the desert mountain ranges.

According to Savage (1952) the subspecies *X. v. vigilis* is believed to be the progenitor to the nominal forms that he discussed from Baja California, Mexico.

Family Teiidae Gray

Genus *Cnemidophorus* Wagler

Cnemidophorus tigris tigris Baird and Girard

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17269-72, 17281, 17334-17368, 17563-17616, 20844-20862); Lockes (B.Y.U. 18051-2).

Utah: Box Elder Co., Bird Id., Great S. L. (U. of U. 793). Tooele Co., Dugway PG (B.Y.U. 14811-7, 14851, 14874, U. of U. 3395-8), Cedar Mtns. (U. of U. 463). Desert Mtns., 14.5 mi N and 12 mi E Wendover (U. of U. 3257-62); Skull V. (U. of U. 842), Low (U. of U. 935-935a), Knoll (B.Y.U. 2919), Gold Hill (B.Y.U. 11951). S. L. Co., S. L. City (U. of U. 3012, 496-9, 508-9, 646-7, 2275), Univ.

Utah (U. of U. 355), Dry Cn. (U. of U. 419), City Cr. Cn. (U. of U. 671), North S. L. City (U. of U. 2264), near Ft. Douglas (U. of U. 3410), Sandy (U. of U. 269). Utah Co., Elberta (B.Y.U. 16603-6), Rock Cn. (B.Y.U. 8758), Provo, Bonneville Bench (B.Y.U. 578), Springville (U. of U. 487), Blowhole country, W side Utah L. (U. of U. 2288-92, 2337), Grove Cr. (B.Y.U. 586, 1824), 6 mi N Goshen (B.Y.U. 577, 1806-7, 1880, 11944, 8493-5). Millard Co., Sand dunes (B.Y.U. 10177), Lynndyl (U. of U. 464), Oak City, 2 mi S and 2 mi W (U. of U. 3309-14). Sevier Co., Richfield (U. of U. 139), Salina Cn. (U. of U. 1719-23). Juab Co., 4 mi E Cherry Cr. (B.Y.U. 9402, 13024). Iron Co., Cedar City (B.Y.U. 194). Beaver Co., Wah Wah Spr. (B.Y.U. 11949).

Variation—Camp (1916) remarked that specimens from the southern areas of this lizard's distributional range possessed darker ventral colors and a larger size than the lizards obtained in the more northern areas. Burt (1931) noted that in Great Basin specimens "the dorsal coloration . . . is predominantly brown and the ventral coloration often deep black or slaty," and that "specimens from the lower levels, particularly from deserts, tend to become brownish above and black below, whereas those from the higher, more mountainous districts tend to become black above in ground color and white below." In the desert specimens "the dorsal pattern is poorly defined, but it is well defined in the mountain specimens."

Specimens examined show some sexual dimorphism in snout-vent length with males being larger than females. This is true of the limited Utah samples [♂ 11 (79.63) 44-99; ♀ 8 (74.5) 42-97], and the more extensive Nevada Test Site material [♂ 52 (85.63) 76-95; ♀ 43 (83.74) 71.98]. There is only limited sexual dimorphism in femoral pores and dorsal scales. As already indicated there are significant differences in size between the Utah and Nevada Test Site samples. However, we desire additional material from more areas in western Utah before final evaluation is made of these data.

Remarks—This single representative species of the essentially South American lizard family Teiidae (Dunn, 1931) is widespread throughout the entire Great Basin and adjacent areas. Although large populations are frequently found in the numerous Great Basin valleys, they also occur in the lower foothill areas as well.

The extreme variation in altitude and latitude exhibited by present populations of this lizard suggests that previous populations could have survived the pluvial periods in and around the freshwater lakes extant at that time.

Family Scincidae Gray

Genus *Eumeces* Wiegmann

Eumeces skiltonianus utahensis W. Tanner

Material Examined—Ida.: Bannock Co., Lava Hot Spr. (B.Y.U. 11645).

Nev.: Lincoln Co., Pioche (B.Y.U. 533). Nye Co., NTS. Mercury (B.Y.U. 17933-17928, 22208 and 22225). W. P. Co., Lehman Caves, N.M., Baker (B.Y.U. 13753-55).

Utah: Beaver Co., Milford (B.Y.U. 535, 23576-7 and 23578-80), 12.3 mi N Beaver on west side highway 91 (B.Y.U. 12661-12664, 12705, 12706, 12725, 12726). Box Elder Co., 8 mi W Rosette (U. of U. 2652). Juab Co., Cherry Cr. (B.Y.U. 9067). Piute Co., near Circleville (U. of U. 1326). S. L. Co., Ft. Douglas (U. of U. 361). Sanpete Co., Ephraim (U. of U. 189). Sevier Co., 9 mi SE Sigurd (B.Y.U. 11759-60, 12639-42), .3 mi E Sevier-Millard Co. line (B.Y.U. 12660). Summit Co., Peoa (B.Y.U. 648). Tooele Co., 5 mi N Ibapah (U. of U. 2637), Faust Cn. (U. of U. 1671). Utah Co., Cabins West Cn. (B.Y.U. 2849-50, 2217-30, 2292-3, 2231-3139, 15048, 16621, 16651, 21939-21948), Diamond Fork Cn. (B.Y.U. 2780), Spanish Fork Cn. (B.Y.U. 536, 1795-6), Cedar V. (B.Y.U. 537, 2099), West Cn., N Cedar Ft. (B.Y.U. 12652-7, 12659, 13133-13750, 13766, 13756-13765, 13778-80), Cn. above Mercur (B.Y.U. 12651), Cedar V. (B.Y.U. 6945-6, 10402, 11970). Washington Co., Pinto (B.Y.U. 10540).

Remarks—The distributional pattern of this form is somewhat comparable with the iguanids *Sceloporus occidentalis* and *S. graciosus*. Like both *S. occidentalis* and *S. graciosus*, *E. skiltonianus* inhabits lower elevations in the northern Great Basin and is restricted to higher altitudes of the larger isolated mountain ranges in the south. Also, as for *S. occidentalis*, the larger, more continuous populations of the species complex occur in mountain ranges and foothill areas of the Pacific Coast of California, Oregon and Washington.

Knowledge pertaining to the distribution of this species is extremely spotty. This is due primarily to the fact that collecting activities have been restricted, and, owing to the fact that in those areas visited by the numerous collectors of zoological specimens over the years, concern for obtaining suitable samples of lizard specimens has been limited.

Populations of *Eumeces skiltonianus* possibly could have occupied more extensive areas than at present during some of the more humid periods of the Tertiary, which, according to the works of Axelrod (1940, 1948, 1950, 1956, 1957, 1958) and Wells and Jorgensen (1964), is borne out by the paleobotanical record from many localities in the Great Basin.

According to Norris (1958) the "lack of differentiation of the isolated populations points to a Pleistocene separation." As has been pointed out by Banta (1963b) populations of this lizard would have been very comfortable in the more moist environments surrounding the various Pluvial lakes during the Pleistocene. With the desiccation of the Pluvial lakes, as a result of increasingly arid conditions, populations survived only in the more mesic niches occurring in the higher mountain ranges or along the courses of the more permanent streams. This type of distribution is particularly apparent in the mountains of Nevada.

Eumeces gilberti rubricaudatus Taylor

MATERIAL EXAMINED—CALIF.: Inyo Co., Nelson Mtns., Saline Valley hydrographic basin (B.Y.U. 16566).

REMARKS—The distribution of this skink is poorly known in the southeastern Great Basin. Hardy (1948) reported a specimen from the Sheep Mountains, indicating that the distribution extends across southern Nevada east of Saline Valley. Banta (1962) reported the occurrence of this species in the Spring (Charleston) Mountains of Clark County. Bradley and Deacon (1966) reported additional material verifying the occurrence of this species in the Spring Mountains.

Order: Serpentes

Family: Boidae

Genus *Charina* Gray

Charina bottae utahensis Van Denburgh

MATERIAL EXAMINED—IDA.: B. L. Co., Paris (B.Y.U. 93).

UTAH: Weber Co., Ogden (U. of U. 1746). Davis Co., Ward Cn. (U. of U. 2832). S. L. Co., S. L. City (U. of U. 832, 2003, 1984, 2118, 2243, 2828, 2648, 2825), Alta (U. of U. 2844), Little Cottonwood Cn. (U. of U. 3222). Summit Co., Woodland (B.Y.U. 2850). Wasatch Co., Wallsburg (B.Y.U. 2936). Utah Co., Aspen Grove (B.Y.U. 87, 91, 95, 674, 690, 842-850, 888, 1386-7, 1834-5, 1951-54, 3644, 4303-4, 8091, 8484, 8885, 10238-42), Provo Cn. (B.Y.U. 94, 676, 2828, 6052). American Fk. Cn. (B.Y U. 691, 2865, 14696), Hobble Cr. Cn. (B.Y.U. 2937), Payson Cn. (B.Y.U. 699, 2725), Rock Cn. (B.Y.U. 676). Juab Co., Salt Cr. Cn. (U. of U. 3015-6). Sanpete Co., 4 mi E Fairview (B.Y.U. 11768).

VARIATION—Van Denburgh (1920b) and Klauber (1943) have shown some of the distinct features of the Great Basin populations compared with those populations inhabiting the more humid regions of the Pacific Coast of North America. Comparable samples from the Toyabe Range (Linsdale 1938, 1940) and other central Great Basin mountains are not yet available for systematic assessment. Only those populations in the Wasatch Mountains along the eastern edge of the Great Basin have been sampled sufficiently to provide variation data (Tanner, 1933).

Snout-vent lengths of males are noticeably greater than females [♂ 22 (390.72) 202-533; ♀ 26 (344.27) 170-586]. This is likewise true of tail lengths [♂ 22 (59.36) 27-83; ♀ 26 (53.27) 22-72]. There is only slight sexual differences in the number of ventral plates [♂ 24 (204.5) 193-214; ♀ 32 (205) 196-212]. Caudal scales are greater in males than females [♂ 23 (36.7) 35-38; ♀ 31 (35.7) 23-38]. Dorsal scales at midbody are also slightly greater in males than in females [♂ 23 (41.8) 40-46; ♀ 32 (41) 39-44].

REMARKS—The disjunction of the distribution of populations of this animal as demonstrated by available published records (Lins-

dale, 1938, 1940) indicate its preference for more humid environments. Indeed this would suggest that *C. bottae* enjoyed a wider distribution during the moister periods of the Pluvial periods and that the present disjunct distributions reflect the environmental changes brought about by the relatively recent desiccation of fresh water lakes in many areas of the Great Basin. Rubber boas occur in isolated island populations in those higher mountain ranges affording suitable habitat.

Family Colubridae

Genus *Thamnophis* Fitzinger

Thamnophis elegans vagrans Baird and Girard

Material Examined—Ida.: B. L. Co., Paris (B.Y.U. 517, 1613). Franklin Co., Clifton (B.Y.U. 250).

Wyo: Uinta Co., Fossil (B.Y.U. 207).

Utah: Box Elder Co., Tremonton (B.Y.U. 180), Snowville (B.Y.U. 182), Rosevere Cr. (B.Y.U. 177, 1038, 1040). Daggett Co., Manila (B.Y.U. 18244, 12986). Cache Co., Logan Cn. (B.Y.U. 186, 1047, 1084), Tony Grove (B.Y.U. 513, 1611-2), Wellsville Cn. (B.Y.U. 185). Summit Co., Beaver Cr. (B.Y.U. 178). S. L. Co., S. L City (B.Y.U. 14680). Juab Co., 30 mi N Delta (B.Y.U. 582). Utah Co., West Cn. (B.Y.U. 2216, 2240, 2848), Nebo Cn. (B.Y.U. 510), Goshen (B.Y.U. 204), Provo (B.Y U. 181, 203, 377, 387, 1031-1035, 1039, 1041, 1044-6, 1050, 1059, 1066, 1085-7, 1133, 1382-3, 8746-7, 9155-6, 10246-9, 10254, 12999, 13003-4, 14677-8, U. of U. 386, 684-5, 3174-7), Spanish Fk. (B.Y.U. 383-4, 1319, 1390-2). Alpine (U. of U. 119, 818), Aspen Gr. (B.Y.U. 102, 187, 1048-9, 1067-1083, 1643), Altamount (B.Y.U 565), American Fk. (B.Y.U. 14681), Payson (U. of U. 2469-77), Powell Slough (U. of U. 807), Lehi (B.Y.U. 193, 367, 1053, 1058, 1311-4), Provo (B.Y.U. 14991-9, 15025-15034), E side Provo Airport (B.Y.U. 16618-20). Carterville (B.Y.U. 16625). Millard Co., Gandy (B.Y.U. 184, 1042-3). Beaver Co., 2 mi E Minersville (B.Y.U. 579, 1808). Sanpete Co., Fairview (B.Y U. 2753), E Gunnison Reservoir (B.Y.U. 2755), Spring City (B.Y.U. 366). Piute Co., Kingston (B.Y.U. 12916-7) Garfield Co., Bryce Cn. NP (B.Y.U. 544), Antimony (B.Y.U. 174). Washington Co., Enterprise (B.Y.U. 320).

Variation—Fitch (1940, 1948), Tanner (1950), and Fox (1951b), have provided the most recent studies of variation of this garter snake within the Great Basin and adjacent areas.

Mean snout-vent lengths are much greater in males than females [♂ 75 (390.3) 168-577; ♀ 75 (303.72) 150-594]. This difference is also exhibited by tail lengths [♂ 62 (139 8) 53-195; ♀ 65 (117.5) 50-186]. Pronounced sexual dimorphism also occurs in scale characters. Ventral plates are greater in number in males than females [♂ 85 (171.8) 164-180; ♀ 71 (166.24) 158-178] as is likewise the case with caudals [♂ 75 (84.6) 61-94; ♀ 66 (76.77) 67-91]. Dorsal

scales at midbody are very slightly greater in females than males [♀ 72 (20.83) 19-21; ♂ 84 (20.7) 19-21]. Variations occurring in populations from the eastern Great Basin and including many of the specimens listed above as well as specimens from adjoining populations is summarized by Tanner (1950).

Remarks—The fact that a number of specimens of this wide-ranging garter snake have been found away from the immediate proximity to water indicates its adaptation to more terrestrial conditions. This fact alone would account for its pronounced success and present wide distribution throughout the Great Basin. Populations of this snake could have enjoyed as wide or possibly even a much wider distribution, particularly in the desert valleys, during the more Pluvial periods.

Thamnophis sirtalis parietalis Say

Material Examined—Ida.: Franklin Co., Clifton (B.Y.U. 251).

Utah: Box Elder Co., Brigham City (U. of U. 348-9), Chesapeake Gun Club (U. of U. 1350), Cache Co., Dry L. (B.Y.U. 508, 512, 1605-7, 1659, 1678), Logan (B.Y.U. 2833). Davis Co., Farmington (U. of U. 944, 944a, 945, 945a, 946a), Woods Cross (U. of U. 114-5, 1122, 1220), ½ mi SW Phillips Oil Refinery (U. of U. 3054-6, 3060, 3071, 3074, 3076), Kaysville (U. of U. 333), ½ mi N Woods Cross (B.Y.U. 23709-17, 23726). Rich Co., Bear L. (B.Y.U. 209, 929, 1089). Salt Lake Co., S. L. City (U. of U. 46, 204, 204a, 388), Farmington Bay Refuge, 15 mi NW S. L. City (U. of U. 3144-5). Utah Co., Provo (B.Y.U. 210, 382, 1090-92, 1096, 1171, 1384, 1296, 12970-4), Payson (U. of U. 2467-8), American Fk (U. of U. 363), Powell's Slough, Utah L. Shore (U. of U. 808), Salem (B.Y.U. 8750-1), Benjamin (B.Y.U. 8749). Weber Co., Farr West (B.Y.U. 208), Ogden (U. of U. 328).

Variation—The ventrals and caudals are higher in the males than in the females [♂ 34 (164.56) 159-170; ♀ 40 (160.50) 156-168]. Caudals [♂ 31 (83.48) 78-89; ♀ 34 (76.76) 72-84]. There is also a sexual dimorphism in the ratio of the tail to total length with the males 2 to 3 percent longer. [♂ 17 (252) 238-267; ♀ 11 (235) 222-248]. The infralabials vary between 9 and 10 with many specimens having a formula of 9-10.

Remarks—Although Fitch and Maslin (1961) provided a redescription of several recognized subspecies of *Thamnophis sirtalis*, they did not provide specific variation or locality data for material examined in the eastern Great Basin. Their general statement that scalation is remarkably uniform, that variation follows clines and is chiefly to be found in the color pattern agrees generally with our findings. We have examined eighty specimens from the Great Basin and compared them with a small series from the Snake River drainage and a series from Kansas.

The skin pattern as represented for *fitchi* (Fitch and Maslin, Fig. 2) does not represent the pattern generally found in Utah

sirtalis. Although there is individual variation, most specimens show the small red spots above the major red H marks (between the 7-9 scale rows). This character is similar to *parietalis* except that in the Utah series a darker background usually surrounds the red splotches.

The paired dark dots on the anterior edge of each ventral in *parietalis* are also present in most (60 percent) of the Utah series. There is considerable variation as to size, darkness of spot and their regular occurrence on each ventral. There is obviously a difference when compared with Kansas *parietalis* and yet if one is to choose between presence or absence of ventral spots as a key character, most specimens would fall into the *parietalis* subspecies.

Four clutches of young were examined (3 Utah and 1 Kansas) to determine if there was a difference in the color pattern between young and adults. None could be noted; however, it was noted that the individuals of two Utah clutches had ventral spots, whereas in the third, most were without.

On the basis of the material examined we are not convinced that the Continental Divide is the dividing line between *parietalis* and *fitchi*. If specimen characteristics are the criteria to be used, then the Utah series is, on the basis of percentage, a part of *parietalis*. We believe that the populations in southeastern Idaho and northern Utah are more closely related to *parietalis*, but that the influence of *fitchi* is apparent in some local populations, and will become more obvious in more western populations.

We note that Fitch and Maslin (1961:304) place *sirtalis* in the Sevier River valley; however, their distribution map (Fig. 1) extends only into Utah Valley. Our records conform to the distribution map.

Genus *Diadophis* Baird and Girard

Diadophis regalis regalis Baird and Girard

Material Examined—Ida.: Franklin Co., Preston (U.A. Coll.). Nev.: Lincoln Co., 1 mi E Caliente (B.Y.U. 11113).

Utah: Tooele Co., Dugway PG (B.Y.U. 14797-8). Utah Co., Pole Cn. (U. of U. 2006), S fork West Cn. (B.Y.U. 13775, 14168-9, 14672-3, 23329-30). Piute Co., Circleville (B.Y.U. 2701). Millard Co., Fillmore (B.Y.U. 11246). Juab Co., Birch Cr. Cn. (U. of U. 1213). Beaver Co., 10 mi S Minersville (B.Y.U. 21759).

Variation—In the limited samples available females have a longer snout-vent length than males [♂ 4 (341) 280-378; ♀ 10 (351.25) 167-573]. Tail lengths are slightly greater in males than in females [♂ 4 (87) 71-106; ♀ 10 (84.75) 34-120]. Ventral plates are significantly greater in females [♂ 4 (209.33) 208-211; ♀ 10 (227.37) 219-233], and caudals are noticeably greater in males [♂ 3 (73.66) 72-76; ♀ 8 (67.5) 62-72]. Dorsal scales at midbody were usually 17. In none is there an indication of a nape band.

Remarks—As the present records indicate, this is one of a group of colubrid snakes which seems to be restricted to the more moist east-

ern portions of the Great Basin. Its near total absence from the western Great Basin, according to available records, would not indicate a wider distribution into central Nevada during the Pluvial periods. However, the present spotty distribution in Utah and the difficulty in finding it prevents us from precluding its presence in higher ranges of central Nevada.

Genus *Coluber* Linnaeus

Coluber constrictor mormon Baird and Girard

MATERIAL EXAMINED—IDA.: Franklin Co., Clifton (B.Y.U. 108, 894-896).

UTAH: Box Elder Co., Blue Ridge Mts. (B.Y.U. 98). Cache Co., Dry Lake (B.Y.U. 509), Wellsville Cn. (B.Y.U. 102), Logan (B.Y.U. 2832). Davis Co., Woods Cross (U. of U. 2840-3), Farmington (U. of U. 1453, 1752-54), Farmington Bay (B.Y.U. 2728). S. L. Co., S. L. City (U. of U. 2644, 858c, 2808, 1755-6; B.Y.U. 105), Ft. Douglas (U. of U. 9, B.Y.U. 2777), mth. Emigration Cn. (U. of U. 1400-1), Antelope Id. 5 mi S (U. of U. 2193). Utah Co., Alpine (U. of U. 9A, 9B, B.Y.U. 633), Provo Cn., N. fk. (B.Y.U. 15014), Provo Cn., Girl Scout Camp (B.Y.U. 15014), Provo (B.Y.U. 101, 103, 22094), Hobblecreek Cn. (B.Y.U. 107), Diamond Fk. Cn. (B.Y.U. 104), Aspen Grove (B.Y.U. 110), Rattlesnake spur (B.Y.U. 13043), Saratoga Den (B.Y.U. 1704), Salem Pond (B.Y.U. 2992). Millard Co., Oak Cr. R. S. (U. of U. 3354-6). Sanpete Co., Ephraim (U. of U. 2a-c). Tooele Co., Tooele V. (U. of U. 350). Morgan Co., Morgan (U. of U. 223), E. Como Spr. (U. of U. 1210). Weber Co., Farr West (B.Y.U. 109).

VARIATION—Sexual dimorphism is developed in the samples examined. Males have a slightly lower ventral count than females [♂ 16 (170.8) 167-178; ♀ 15 (172.8) 168-180]. Females have a lower number of caudals [♂ 16 (93.12) 86-100; ♀ 11 (88.27) 84-92].

Approximately one third of the specimens have seven supralabials on one or both sides; the others have eight. Infralabials have about the same ratio (1.2) of eight and nine scales respectively. The dorsals are uniformly 17 rows anteriorly but are occasionally 16 at the vent.

REMARKS—This is a wide-ranging snake. It occurs not only in much of the Great Basin but extends to the Pacific Coast regions of California, Oregon and Washington in a distribution pattern somewhat resembling that of the boid *Charina bottae*. However, populations of the yellow-bellied racer do not seem to be restricted to as moist an environment as *C. bottae* and in the Great Basin are frequently found where streams extend out into the sagebrush-steppe areas which occupy much of the northern parts of the region. It is unlikely that the yellow-bellied racer was affected as much as other Great Basin reptiles by the more moist conditions which prevailed during Pluvial times.

The habitat of this species has been extended in those areas where irrigation is practiced. Presumably it originally inhabited only the stream-side habitats of the valleys and from the oak brush foot hills up to the aspen-conifer forest at elevations of 7,000 ft. Adults have been taken in the spring and fall as they emerged or entered dens also occupied by *Crotalus* and *Pituophis*.

Genus *Masticophis* Baird and Girard

Masticophis taeniatus taeniatus Hallowell.

Material Examined—Nev.: Churchill Co., 90 mi E Fallon (B.Y.U. 16650). Nye Co., NTS, Mercury (B.Y.U. 17409, 18755-6).

Utah: Box Elder Co., Locomotive Sprs. (U. of U. 2000-2004, 917-8, 918a). Tooele Co., Dugway PG (B.Y.U. 14823), betw. Ophir and Mercur (U. of U. 2032), Grantsville (U. of U. 1960, 1967, 2478, 2482), Wendover, 15 mi N and 9 mi E (U. of U. 3253), Lookout Pass (U. of U. 1219a), Gold Hill (B.Y.U. 2998). Utah Co., Meseda Bench Prospect (B.Y.U. 14986). Blowholes, W side Utah L. (U. of U.), Cedar V. (U. of U. 1299, B.Y.U. 2779, 14684), Chimney Rock Pass (B.Y.U. 2842, 14685), Lake Mtn., W side (B.Y.U. 386). Millard Co., 20 mi W Hinckley (B.Y.U. 16590), 3 mi N Cove Ft. (B.Y.U. 568), Desert Range Exper. Sta. (B.Y.U. 563, 1637, 1809). Juab Co., Dividend (B.Y.U. 247), Topaz Mtn. (B.Y.U. 9072). Beaver Co., Milford V. between Milford and Minersville (B.Y.U. 564, 1640-1). Iron Co., Cedar City (B.Y.U. 392).

Variation—Dorsal scale rows at midbody are 15 in all the above specimens. Variation occurs before the vent where there may be 11, 12 or 13 rows. Approximately 65 percent have 12 rows with 11 more common than 13 rows. Sexual dimorphism occurs in the ventrals and caudals, with the females having the higher average ventral count [♀ 21 (207.14) 199-218; ♂ 27 (204.52) 199-210] and the males the higher average caudal count [♂ 21 (139.29) 127-143; ♀ 19 (132.21) 124-147]. Supralabials are usually 8, occasionally 7 or 9. Infralabials are more commonly 9 but with many specimens having 10.

Remarks—Populations of this snake are widespread in the northern two-thirds of the Great Basin. In the southwestern Great Basin populations have become restricted to the higher mountain ranges surrounded by inhospitable hot desert valleys in contrast to the large populations on the foothills and in the valleys of western Utah. This disjunction would tend to indicate that the species did have a wider distribution, probably during Pluvial times, and the distribution we find today occurred during the interval since desiccation of Pluvial lakes and the drastic environmental changes which have occurred since.

Masticophis flagellum piceus Cope

Material Examined—Calif.: Inyo Co., Oasis (B.Y.U. 18048).

Nev.: Nye Co., NTS, Mercury (B.Y.U. 17401-8, 17920, 17949, 18048, 18764-7, 23634, 23733). Pershing Co., nr. Lovelock, (B.Y.U. 15238).

Variation—Quite in contrast to the other racers occurring in the Great Basin (*Coluber constrictor* and *M. taeniatus*) this species does not indicate any obvious sexual dimorphism. The ventrals are similar [♀ 12 (195.25) 193-199; ♂ 7 (194.5) 192-195] and the caudal average diverges only slightly more [♀ 12 (105.42) 99-109; ♂ 6 (103.4) 95-109]. There is a wider range of caudal variation in the males.

Other scale patterns show little or no variation; the color pattern is uniform and since all specimens are of the red phase, it has been locally designated as the "Red Racer."

Remarks—Populations of this snake are restricted to the warmer and drier environments of the Lahontan basin of western Nevada, the Mojave, Colorado and Sonora Deserts and the deserts of Baja California. Its present occurrence in the Lahontan Basin is doubtless a post-Pluvial phenomenon for it occurs to a large extent within the areas which were innundated by Pluvial Lake Lahontan, and other Pluvial Basins in southwestern Nevada and east central California.

Genus *Opheodrys* Fitzinger

Opheodrys vernalis blanchardi Grobman

Material Examined—Utah: S. L. Co., Mormon Flats, Emigration Cn. (B.Y.U. 16248). Utah Co., Aspen Grove, Provo Cn., nr. M.I.A. Girls' Home (B.Y.U. 519, 1614-6, 1845, 1936-7, 2397, 2972, 3748, 3782-4, 9.36, 10342-3, 13200, 14380, 15020-3, 15018-23, 16660, U. of U. 35, 314).

Variation—Specimens examined show a considerable degree of sexual dimorphism in the number of ventral plates being significantly higher in females than in males [♀ 24 (147.04) 144-151; ♂ 27 (136.33) 132-140]. Dimorphism also exists in the caudal scale differences but with the males having the higher counts [♀ 20 (71.75) 66-76; ♂ 24 (81.42) 74-89]. Except for an occasional specimen having one or no loreals, all other scale patterns are usually uniform.

Remarks—The smooth green snake is restricted to the Wasatch Mountains bordering the eastern edge of the Great Basin. Many of the present records are from high elevations (Aspen-Conifer forests) having a more moist and cooler climate. It is conceivable, though difficult to establish, that this animal extended its distribution well into the eastern margins of Lake Bonneville during the Pluvial periods and that its present distribution reflects survival of populations only at the higher elevation.

Genus *Salvadora* Cope

Salvadora hexalepis mojavensis Bogert

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U.

17392-17395, 17948, 18736, 18762-18764), C. P. Cane Springs turn off along rd., NTS, Mercury (B.Y.U. 18985).

Variation—Ventral plates in seven males ranged from 196 to 204 with a mean of 198.57. In 3 females the range was 194 to 207 with a mean of 200. Subcaudals in females had a mean of 84.33 with a range of 77-89. In males subcaudals ranged from 89-95 with a mean at 91.66. Males were larger than females in snout-vent length [♂ 7 (521.85) 252-697; ♀ 3 (392.33) 256-494].

Remarks—Patchnose snakes at the Nevada Test Site occur in the valleys and on the adjoining foothills surrounding them. They have been found invading live wire mammal traps in study plots presumably in quest of captured lizards. At the N.T.S. this species is found in habitat commonly inhabited by such species as *Crotaphytus wislizeni*, *Phrynosoma platyrhinos*, *Callisaurus draconoides*, *Masticophis flagellum* and *Crotalus cerastes*.

This species, as in the case of several others, has apparently invaded the western Great Basin since the last Pluvial period.

Genus *Phyllorhynchus* Cope

Phyllorhynchus decurtatus perkinsi Klauber

Material Examined—Nev: Nye Co., NTS, Mercury (B.Y.U. 17924-5, 17758-9, 23730-1).

Variation—Five of the above specimens are males, with 169 to 173 ventrals; the one female has 182 ventrals and 30 subcaudals. Caudals in the males range from 38 to 40 with a mean of 38.6. The female is 371 mm. in total length with a tail of 25 mm. The males range in total length from 253 to 374 with a mean of 325. The male tail lengths range from 33 to 57 with a mean of 48.33. The percent of tail to total length is as follows: males 15 to 16.5 percent and the female approximately seven percent. This sexual dimorphism is also reflected in the caudal counts.

Remarks—Variations in the populations of the northern part of the range are not well understood because of the few specimens available. However, the six sepcimens from the N.T.S. do indicate fewer ventrals, more caudals and longer tails in males, but a shorter tail in the single female. It is possible that there is considerable isolation between the populations occurring in the several pluvial valleys of southwestern Nevada.

Genus *Arizona* Kennicott

Arizona elegans candida Klauber

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17396-7, 17400, 18760); 15 mi NW Main gate, NTS (B.Y.U. 21215); 3.4 mi S Main gate (B.Y.U. 21285); 15.7 mi SE Main gate (B.Y.U. 21284).

VARIATION—Three males and four females have been examined. Sexual dimorphism is apparent but not well developed in the scales which usually reflect it. The ventrals average ♂ 211.7, ♀ 216.5, caudals ♂ 50, ♀ 49. Other scale patterns are within the limits of variation set up by Klauber (1946) for this subspecies.

REMARKS—Tanner and Jorgensen (1963) reported the first record of this subspecies in Nevada. This seems to establish *candida* as the only subspecies occurring in the Great Basin from Nye County north and west into other possible counties in Nevada and in adjoining California. Such a distribution is plausible and leaves southeastern Nevada (Clark Co.) and adjoining Arizona and Utah (Washington Co.) to the northeast in the range of *eburnata*.

Genus *Pituophis* Holbrook

Pituophis catenifer deserticola Stejneger

MATERIAL EXAMINED—IDA.: Bannock Co., Swan L. (B.Y.U. 2875).

NEV.: Lander Co., Battle Mtn. (B.Y.U. 2916, 2979). Nye Co. NTS Mercury (B.Y.U. 17410-12, 17917-8, 18768-18771). W. P. Co., Lund (B.Y.U. 6916).

UTAH: Beaver Co., Milford V. betw. Milford and Minersville (B.Y.U. 566), Milford (B.Y.U. 2736, 3021). Box Elder Co., Hansel V. (PC), Lucin (B.Y.U. 13018), 5 mi E Saline (U. of U. 2822-3), Locomotive Spr. (U. of U. 2031). Cache Co., Smithfield (B.Y.U. 2830), Logan (B.Y.U. 2831, 2193, 2195). Iron Co., Newcastle, 4 mi S (B.Y.U. 16675), Kanarraville (B.Y.U. 393), Hieroglyphic Gap (B.Y.U. 11314). Juab Co., 4 mi S Levan (B.Y.U.), 2 mi S Silver City (B.Y.U. 274), sand dunes 10 mi N Lynndyl (B.Y.U. 2729), Levan (B.Y.U. 16791), Fish Spr. (U. of U. 2234-5). Millard Co., Clear L. (B.Y.U. 11298), S Notch Mtn., U.S. Hwy 6 (B.Y.U. 14697), Desert Range Exper. Sta. (B.Y.U. 16657). Piute Co., 8 mi S Antimony (U. of U. 840). S. L. Co., Ft. Douglas (B.Y.U. 2776, U. of U. 3), Mill Cr. (U. of U. 44943). S. L. City (U. of U. 72), 5 mi SE Antelope Island (U. of U. 2189-92), Sandy (U. of U. 307). Sanpete Co.. On rd. to Sterling Reservoir (B.Y.U. 2A), Mt. Pleasant (U. of U. 4). Sevier Co., Marysville Cn. (B.Y.U. 2749), Jct. Sigurd-Richfield rd. (B.Y.U. 670). Tooele Co., Bunker Hill Mine (B.Y.U. 666), Dugway (B.Y.U. 14793-4), Grantsville (U. of U. 2646, 1964-5), Mercur (U. of U. 2026), 3 mi W Willow Spr. (U. of U 1213). Utah Co.. Provo Cn. (B.Y.U. 8745, 14987), Provo (B.Y.U. 270, 1170, 1665, U. of U. 339, 380), Pleasant Grove (U. of U. 880), Thistle Cn. (B.Y.U. 2754), Thistle (B.Y.U. 673), Chimney Rock Pass (B.Y.U. 2840, 4248), Manila (B.Y.U. 18245), W Mtns. (B.Y.U. 6944), Grove Cr. (B.Y.U. 585), Pelican Pt. (B.Y.U. 1822-3, U. of U. 943A), Springville (B.Y.U. 342), Tintic (B.Y.U. 2737), Fairfield (U. of U. 1929), Pole Cn. (B.Y.U. 15003), 4 mi W Lehi (B.Y.U. 284, 378, 1099. 1877, 1879, 2715, 2035, 14676), Payson (B.Y.U. 3705), 2 mi W Cedar Ft. (U. of U. 1, 2433).

Variation—Reviews by Tanner (1939), Stull (1940) and Klauber (1947) have provided some insight into the variation of the samples of Great Basin populations which they examined. In each of these reviews the subspecies *stejnegeri* proposed by Van Denburgh (1920) for those populations occurring in the eastern Great Basin (type locality Fort Douglas, Utah) was not recognized. Tanner and Jorgensen (1963) reaffirmed the clines noted previously by other authors in the dorsal rows and ventrals.

Remarks—This is one of the most common colubrid snakes in many portions of the Great Basin. A fact amply demonstrated not only by noting the number of individuals of this snake killed on the various paved highways which traverse the region, but also by the large number of preserved specimens in research collections. Many of the records are from or near cultivated areas, which suggest that this form has enjoyed some success in adapting to the revolutionary ecological situations created by man, populations may be drawn into such areas because of the increased rodent (food) supply which normally occurs in cultivated areas.

Genus *Lampropeltis* Fitzinger

Lampropeltis pyromelana infralabialis W. Tanner

Material Examined—Nev.: W. P. Co., Saw Mill Cn. (U. of U. 2814A).

Utah: Beaver Co., Beaver (B.Y.U. 10340, 11287-8). Piute Co., Antimony (B.Y.U. 8643). Sevier Co., Annabelle (B.Y.U. 11111). Wasatch Co., Wallsburg (B.Y.U. 322).

Variation—Some aspects of the variation of this seemingly rare snake were provided by Tanner (1953). Ventral scales in the above samples are higher in females than males [♂ 4 (226.5) 213-230; ♀ 3 (221) 216-224]. There does not seem to be a comparable degree of sexual dimorphism in subcaudals [♂ 2 (69) 67-71; ♀ 3 (69.66) 68-71]. Sexual differences in the number of body spots are not too conspicuous [♂ 4 (46) 40-49; ♀ 3 (44.33) 39-50].

Remarks—Present records indicate that this beautiful snake is limited to the eastern Great Basin. It was probably derived from progenitors in the Mexican Plateau. It seems to be quite hydrophilic not extending in the more xeric portions within its range, but restricted to montane island populations where such areas are surrounded by xeric environments.

Lampropeltis getulus californiae Blainville

Material Examined—Calif: Inyo Co., Independence (B.Y.U. 18965).

Nev.: Nye Co., NTS, Mercury (B.Y.U. 17398, 17946, 21758, 23614).

Variation—The specimen from Independence was so badly smashed that but few characters could be discerned. Selected data

for the Nevada specimens are: ventrals 4 (247.33) 236-253; subcaudals 3 (55) 53-59; snout vent length 3 (739.66) 401-975. All specimens seen are of the banded color pattern and resemble closely those seen from the Colorado River drainage in southwestern Utah.

Lampropeltis doliata utahensis W. Tanner and Loomis

Material Examined—Utah: Garfield Co., near Panguitch (B.Y.U. 8923). Juab Co., 8 mi S Eureka (U. of U. 3018). S. L. Co., Near Lark (U. of U. 1413), Butterfield Cn. (U. of U. 1430). Sanpete Co., S edge of Ephraim (B.Y.U. 11117), Mt. Pleasant (B.Y.U. 2929), Moroni (U. of U. 90). Tooele Co., Tooele V. (B.Y.U. 334), Benmore (B.Y.U. 8922), Tooele (U. of U. 317, 426). Utah Co., 2 mi N Alpine (B.Y.U. 10533), 3 mi E Thistle (B.Y.U. 337-8, 1505), Provo (B.Y.U. 333), Cedar V. (B.Y.U. 2930), Payson (B.Y.U. 6023), foothills N Lehi (B.Y.U. 2718), Alpine (B.Y.U. 2756, 14382), Spanish Fk. (B.Y.U. 336), Hobble Cr. Cn. (B.Y.U. 520, 2924, 12415), Springville (B.Y.U. 11249, 23167), Cabins West Cn. (B.Y.U. 13776-7), Rock Cn. (B.Y.U. 11100), mouth of Pole Cn. near Cedar Ft. (U. of U. 1963). Wasatch Co., Wallsburg (U. of U. 318).

Variation—Few additional specimens are available since the description of *L. d. taylori*. It is therefore suggested that variations listed by Tanner and Loomis (1957) be considered.

Remarks—The habits and habitats of this subspecies are not well known. Most specimens were collected by amateur or interested laymen and given to the universities at a later date.

Many specimens are brought to the universities dead, most of them having been killed by the collectors. When asked why the specimen was killed one of two answers is given: Isn't it a poisonous coral snake? Or, the snake bites. Most individuals bite, even young ones; however, they are neither poisonous nor a coral snake. In the Great Basin of Utah, snakes having an appearance of coral snakes are king snakes.

Genus *Rhinocheilus* Baird and Girard

Rhinocheilus lecontei lecontei Baird and Girard

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17399, 17945, 18761, 21756-7, 23635).

Utah: Tooele Co., Dugway PG (B.Y.U. 14799-14800). Juab Co., 10 mi SE Callao (B.Y.U. 2965, 11294). Millard Co., Fillmore (B.Y.U. 2931), White V. (B.Y.U. 1162, 2863).

Variation—There is little variation in the small series from southern Nevada and western Utah. Males average a few more ventrals [♂ 6 (203.8), ♀ 4 (200.5)] and caudals [♂ 5 (52.2), ♀ 5 (49.0)] than the females. Other scale patterns are uniform.

For a discussion of the variation in the color pattern the study of Tanner and Jorgensen (1963:24) includes the same material examined above and expresses our views adequately.

Remarks—The occurrence of *Rhinocheilus* in the Bonneville Basin of eastern Nevada and western Utah is of more than passing interest. Such species as *Crotalus cerastes*, *Crotalus mitchelli*, *Tantilla utahensis*, *Trimorphodon lambda*, *Lampropeltis getulus*, *Arizona elegans*, *Salvidora hexalepis*, *Masticophis flagellum*, *Sceloporus magister*, *Sauromalus obesus* and *Coleonyx variegatus* inhabit the same general habitat as does *Rhinocheilus* in Washington County, Utah, and in southern Nevada. In spite of this, *R. lecontei* is the only species of this presumably Lower Sonoran group to invade the Bonneville Basin. All specimens thus far taken in western Utah have come from the western valleys, strongly suggesting that it has extended its range since the last Pluvial Period.

Genus *Sonora* Baird and Girard

Sonora semiannulata isozona Cope

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17386, 17919, 17930, 18734-5, 18757), E Lathrop Wells (B.Y.U. 23683-4).

Variation—All of the above specimens are males except for one female. One specimen has a striped pattern with the four middorsal rows reddish-orange grading laterally into gray. All others are of the usual bicolored phase.

Sizes in terms of snout-vent length ranged from 209 to 295 mm. with a mean of 251.4. Ventral plates in the males ranged from 161-168 with a mean of 165. Caudals ranged in number from 56-61 with a mean of 57.

Remarks—Considerably more collecting must be done in the Great Basin before we will understand the distribution of this species. Its occurrence in the Snake River Valley below Boise, Idaho, suggests that its distribution extends throughout the Great Basin; however, the Idaho population appears to be isolated with no known populations in western Utah or in central and northeastern Nevada. Other than the Nye County records Banta (1965) lists this species as occurring in Humboldt, Pershing and Washoe Counties all in the western (Lahontan) basin. Indications are that *Sonora* reached the Snake River Valley through the western part of the Great Basin in Nevada, southern Oregon and then into Idaho. Proper collecting methods (can traps, etc.) at the appropriate seasons may yet connect these disjunct populations.

Genus *Chionactis* Cope

Chionactis occipitalis talpina Klauber

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17369-85, 17919, 18741-54); Jackass Flats (B.Y.U. 23631); Lathrop Wells (B.Y.U. 23685-88).

Variation—The variations occurring in this subspecies are summarized for Nye County by Tanner and Jorgensen (1963) and for adjoining California by Elvin (1963). The averages for the ventrals and caudals for the specimens listed above are ♂ 151.3, ♀ 161.0 and ♂ 45.3, ♀ 44.8 respectively.

Remarks—Variations in the ranges of the ventrals and caudals (♂ 18, 148-155, ♀ 14, 155-166; ♂ 18, 41-49, ♀ 13, 43-47) overlap these scale patterns in *o. occipitalis*. We therefore designate *o. talpina* as a subspecies on the color pattern (presence of secondary bands) and not for any distinctness in the scale pattern.

Genus *Hypsiglena* Cope

Hypsiglena torquata deserticola W. Tanner

Material Examined—Nev.: Humboldt Co., 28 mi E Winnemucca (B.Y.U. 2912). Nye Co., Mercury NTS (18727), W Lathrop Wells (B.Y.U. 23681).

Utah: Tooele Co., Dugway PG (B.Y.U. 14795). S. L. Co., gravel pits NE S. L. City (U. of U. 1402-7, 1416). Utah Co., 2 mi N Alpine (B.Y.U. 6924, 11248, 11306, 11310, 11401), Bonneville Terrace, Provo (B.Y.U. 3014, 7938, 8011), Chimney Rock Pass (B.Y.U. 2836, 2196-8, 15008-9), 5 mi W Lehi (B.Y.U. 640), Rock Cn., Provo (B.Y.U. 15010, 16253), Meseda Bench (B.Y.U. 2026-8, 2045, 2709, 3960, 7020, 7937, 14698, 23327), Provo (22209). Juab Co., Topaz Mtn. (U. of U. 9068). Sanpete Co., 2 mi NE Ephraim (B.Y.U. 14694-5). Beaver Co., 3 mi N Minersville (B.Y.U. 23550).

Variation—Variations in the ventrals [♂ 14 (182.2); ♀ 16 (190.3)] and caudals [♂ 11 (57.5); ♀ 16 (50.1)] are similar to the variations listed by Tanner (1946) for the entire subspecies. The dorsal rows rarely vary from the 21 rows at midbody; however, before the vent 15, 16 or 17 rows may occur. Most specimens having 16 or 17 rows are females with rarely a male failing to reduce to 15 rows. Females are about equally divided between those having 16 or 17 rows and those with 15.

Remarks—Night snakes are one of the commonest snakes in lower foothill habitats of the Great Basin. In the few areas where intensive collecting has been done this species has provided as many specimens as have other common species. Their habit of moving at night and hiding under rocks in the day has led to the conclusion that the species is rare, an illusion held by the senior author until this snake was intensively studied.

A study now in press (Tanner, 1966) will discuss in part the distribution of this species in the southern Great Basin. We apply the same general thesis that *Hypsiglena* has extended its range considerably since the last major Pluvial Period, and particularly in the northern parts of the Great Basin (principally Lahonton and Bonneville basins).

Genus *Trimorphodon* Cope

Trimorphodon lyrophanes Cope

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17939, 23727).

Variation—The above specimens are males with total lengths of 408 and 502. Tail lengths are 61 and 88 respectively. Both have 221 ventral plates and 75, 77 caudals. Body and tail blotches number 29, 16 and 32, 18 respectively.

Remarks—Collecting records would indicate a small population in the Great Basin of southern Nevada; however, little is known about the specific habits and habitats of this species.

Genus *Tantilla* Baird and Girard

Tantilla planiceps utahensis Blanchard

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17922-3).

Variations and remarks concerning these specimens and others from many localities in southwestern United States and northwestern Mexico are provided in the recent study by Tanner (1966).

Family Crotalidae

Genus *Crotalus* Linnaeus

Crotalus cerastes cerastes Hallowell

Material Examined—Nev.: Nye Co., NTS, Mercury (B.Y.U. 17387-9, 18780-5, 21857, 22207); 29 mi S Goldfield (B.Y.U. 18786). California: Inyo Co., Shoshone, Death Valley (B.Y.U. 20975).

Variation—There is a noticeable sexual dimorphism in both the ventrals [6 ♀ (145.2) 143-146; 9 ♂ (139.7) 138-142] and caudals [6 ♀ (17.7) 16-19; 9 ♂ (22.9) 21-25]. Other variations occur in the labials with both the upper and lower series ranging from 12 to 16 scales, but with most counts 13, 14 or 15 scales.

The color pattern is remarkably uniform. The only variation noted is a slight change in the ground color.

Remarks—The horned rattlesnake occurs in the desert valleys and the adjacent foothills in south and western Nevada. Its present distribution indicates a post-pluvial extension of its range into these more northern valleys. As yet its range does not include areas where *Artemisia tridentata* is the dominant shrub.

Crotalus mitchelli stephensi Klauber

Material Examined—Nev.: Nye Co., NTS Mercury (B.Y.U. 17390-1, 17950-1, 17921, 18772-9, 18970).

Variation—Fifteen specimens (4 females and 11 males) show little variation in the ventrals which average 175.9 and 175.75 re-

spectively. Caudals show sexual dimorphism (♀ 19.0 and ♂ 26.6) and the scale rows are approximately equally distributed between 23 and 25 rows at midbody. There is considerable variation in the labials with both the upper and lower series ranging from 12-16 scales. Most specimens show individual variation with some varying as much as three scales (12-15 or 13-16); however, most vary only a scale or two and are more commonly 13, 14 or 15 scales.

The ground color may vary from a slate grayish to a decided pinkish with the spots taking on shades of brown which compliment and blend with the basic color.

Remarks—We have designated the subspecies occurring in Nye County, Nevada, as *stephensi*. In this species, as in several others (*Arizona elegans*, *Chionactis occipitalis*, *Coleonyx variegatus*) intergradation appears to occur in the adjoining areas to the east. Although most subspecies do not respect the boundaries of the Great Basin, a few seem not to intergrade at or near its boundary in western Clark County.

Crotalus viridis lutosus Klauber

Material Examined—Ida.: Franklin Co., Clifton (B.Y.U. 339).

Nev.: Lander Co., Battle Mtn. (U. of U. 1058). Nye Co., Lockes (B.Y.U. 18966), Troy Cn., 35 mi SW Currant (B.Y.U. 14645). White Pine Co., Cherry Cr. (U. of U. 807a).

Utah: Beaver Co., Minersville (B.Y.U. 355). Box Elder Co., Locomotive Spr. (U. of U. 874-5, 907-921, 924), 6 mi W, 12 N Corrine (U. of U. 3249), Lucin (B.Y.U. 13017). Cache Co., Hills W Logan (B.Y.U. 8276-8). Wellsville Cn. (B.Y.U. 340, 1284). Garfield Co., Bryce Cn., Natl. Park (U. of U. 350). Juab Co., Topaz Mtn. (B.Y.U. 9070), Nephi (U. of U. 115A), Fish Spr. (U. of U. 2237). Millard Co., Desert Range Exper. Sta. (B.Y.U. 14692, U. of U. 2807). Morgan Co., E Como Spr. (U. of U. 1207-9, 2223-2231). S. L. Co., (U. of U. 2854). Emigration Cn. (U. of U. 3342, 1273), 5 mi NE Draper (U. of U. -), nr. Warm Spr. (U. of U. 1303), S. L. City (U. of U. 1674, 3342), Ft. Douglas (U. of U 1674). Sanpete Co., 5 mi S Mayfield (B.Y.U. 16804), 3 mi N Fountain Green (B.Y.U. 669). Maple Cn. (U. of U 680), Mt. Pleasant (U. of U. 112). Ephraim (U. of U. 5-6). Summit Co., 1½ mi NE Coalville (U. of U. 2105-2107, 2195-2209, 2217-2222, 2408). Tooele Co., 15 mi N Ibapah (B.Y.U. 354, 1301, 1381), Ibapah (U. of U. 2236), 3 mi SE Stockton (U. of U. 2144), nr. Stockton (U. of U. 2829), Lowe (U. of U. 1971-7, 1989-95), 4 mi W Grantsville (U. of U. 1432-4, 1979, 2202, 2494, 2638-41). Rush V. (U. of U. 1058-9), Lowe (U. of U. 1971-8, 1989-90), Tooele (U. of U. 288). Clover (U. of U. 1060). Utah Co., Chimney Rock Pass (B.Y.U. 2841, 15016), Nunns, Provo Cn. (B.Y.U. 18248), Rock Cn. (B.Y.U. 9059), Provo Cn. (B.Y.U. 346, 1289). 4 mi W Lehi (B.Y.U. 584, 1821, 2706, 2029-30), "Y" Mtn. E Provo (B.Y.U. 356, 1302, 8741), Spanish Fk. Cn. (B.Y.U. 8742). West Mtns. (B.Y.U. 6942). W side. Cedar V. (B.Y.U. 2845, 2212), S Fk. West Cn. (B.Y.U. 14674-5), Lehi (B.Y.U. 370, 1315). Payson (U. of U.

696), 2 mi S Cedar Ft. (U. of U. 1294-1298, 2479-81), Cedar V. (U. of U. 3117), mth. Spanish Fk. Cn. (U. of U. 2853). Washington Co., Enterprise (B.Y.U. 359). Weber Co., Ogden (U. of U. 2892).

Variation—Sexual dimorphism is moderately developed; however, there is an overlapping of the ranges of variation in the ventrals and caudals so that sex in all specimens cannot be determined by scale counts alone. The ranges of variation and averages are as follows: ventrals, ♂ 65 (177.66) 170-188; ♀ 70 (182.98) 175-191; caudals, ♂ 66 (25.5) 21-32; ♀ 69 (21-55) 18-26. Males are longer than females. An average of fifteen of the largest specimens of each sex indicates the approximate differences in total length: ♂ (952.5) 826-1031; ♀ (855.6) 713-952. Other variations occur in the dorsal rows before the vent, with 19 usually occurring, but occasionally with 21 rows. The labials are variable with both the upper and lower labials ranging from 14 to 17 with 15 the more common number.

Remarks—The Great Basin rattlesnake is perhaps the most widely distributed species in the area. Specimens have been recorded from the low valleys and up to elevations of 9,000 feet. They occur in low brush and also in the oak-aspen habitats at higher elevations.

Throughout the northern part of the Great Basin this species can usually be found in rocky areas in the spring and fall as they emerge or move toward the denning areas. In the summer the valleys serve as feeding grounds for most of the population denning in the surrounding foothills. It is not uncommon for rattlesnakes to move into orchards or other irrigated areas during the summer.

Bibliography

Axelrod, D. I. 1940. Late Tertiary floras of the Great Basin and border areas. Bull. Torrey Bot. Club 67:477-487.

———. 1948. Climate and evolution in western North America during Middle Pliocene time. Evolution 2:127-144.

———. 1950. Evolution of desert vegetation in western North America. Carnegie Inst. Washington Publ. 590:215-306.

———. 1956. Mio-Pliocene floras from west-central Nevada. Univ. California Publ. Geol. Ser. 33:1-322.

———. 1957. Late Tertiary floras and the Sierra Nevada uplift. Bull. Geol. Soc. America 68:19-45.

———. 1958. Evolution of the Madro-Tertiary geoflora. Bot. Rev. 24:433-509.

Banta, B. H. 1962. Notes on the distribution of the western red-tailed skink, *Eumeces gilberti rubricaudatus*, in southern Nevada. Herpetologica, 18(2): 129-130.

———. 1963a. Preliminary remarks upon the zoogeography of the lizards inhabiting the Great Basin of the western United States. Wasmann Jour. Biol. 20(2):253-287.

———. 1963b. A preliminary account of the herpetofauna of the Saline Valley hydrographic basin, Inyo County, California. Wasmann Jour. Biol. 20(2): 161-251.

———. 1963c. Remarks upon dorsal pattern polymorphism in *Sceloporus occidentalis*. Wasmann Jour. Biol. 21(2):137-140.

———. 1965. A distributional check list of the recent reptiles inhabiting the state of Nevada. Occas. Papers, Nevada Biol. Soc., 5:1-8.

———. AND W. W. TANNER. 1964. A brief historical resume of herpetological studies in the Great Basin of the western United States. Part I. The Reptiles. Great Basin Naturalist, 24(2):37-57.

BELL, E. L. 1954. A preliminary report on the subspecies of the western fence lizard, *Sceloporus occidentalis*, and its relationships to the eastern fence lizard, *Sceloporus undulatus*. Herpetologica 10(1):31-36.

BELL, T. 1829. Description of a new species of *Agama* brought from the Columbia River by Mr. Douglass. Trans. Linnean Soc. London 16:105-107.

BLANCHARD, F. N. 1920. A synopsis of the king snakes: genus *Lampropeltis* Fitzinger. Occas. Papers, Mus. Zool., Univ. Michigan 87:1-7.

———. 1921. A revision of the king snakes: genus *Lampropeltis*. United States Nat. Mus. Bull. 114:1-260.

———. 1939. Snakes of the genus *Tantilla* in the United States. Zool. Ser., Field Mus. Nat. Hist. 20(28):369-376.

BOGERT, C. M. 1945. Two additional races of the patch-nosed snake, *Salvador hexalepis*. American Mus. Novit. 1285:1-14.

BRADLEY, W. GLEN AND J. E. DEACON. 1966. Amphibian and reptile records for southern Nevada. Southwestern Naturalist 11(1):132-134.

BRYANT, H. C. 1911. The horned lizards of California and Nevada of the genera *Phrynosoma* and *Anota*. Univ. California Publ. Zool. 9(1):1-84.

BURGER, W. L. 1950. New, revised, and reallocated names for North American whiptailed lizards, genus *Cnemidophorus*. Nat. Hist. Miscellanea 65.

BURT, C. E. AND M. D. BURT. 1929. Field notes and locality records on a collection of amphibians and reptiles, chiefly from the western half of the United States. Part II. Reptiles. Jour. Washington Acad. Sci. 19(20):428-434, 448-460.

———. 1928. The synonymy, variation and distribution of the collared lizard, *Crotaphytus collaris* (Say). Occas. Papers, Mus. Zool., Univ. Michigan. 196:1-19.

———. 1931. A study of the teiid lizards of the genus *Cnemidophorus* with special reference to their phylogenetic relationships. United States Nat. Mus. Bull. 154, viii 286.

———. 1933. Some lizards from the Great Basin of the west and adjacent areas, with comments on the status of various forms. American Midl. Nat. 14(3):228-250.

CAMP, C. L. 1916. The subspecies of *Sceloporus occidentalis* with description of a new form from the Sierra Nevada and systematic notes on other California lizards. Univ. California Publ. Zool. 17(7):63-74.

COCHRAN, D. M. 1961. Type specimens of reptiles and amphibians in the U.S. National Museum. United States Nat. Mus. Bull. 220:xv 291.

COCKERELL, T. D. A. 1901. A horned lizard at high altitude. Science 14:111.

COPE, E. D. 1860. Catalogue of the Colubridae in the Museum of the Academy of Natural Sciences of Philadelphia, with notes and descriptions of new species. Part 2. Proc. Acad. Nat. Sci. Philadelphia 12:241-266.

———. 1892. A synopsis of the species of the teiid genus *Cnemidophorus*. Trans. American Philos. Soc. 17(1):27-52.

———. 1896. The geographical distribution of Batrachia and Reptilia in North America. American Nat. 30:886-902, 1003-1026.

———. 1900. The crocodilians, lizards, and snakes of North America. Annual Report. United States Nat. Mus. for yr. ending June 30, 1898:55-1270.

DAVIS, W. B. 1939. The recent mammals of Idaho. Caldwell, Idaho: The Caxton Printers, Ltd., 400 pp.

DUNN, E. R. 1931. The herpetological fauna of the Americas. Copeia 1931 (3):106-119.

DURRANT, S. D. 1952. Mammals of Utah. Taxonomy and distribution. Univ. Kansas Publ., Mus., Nat. Hist. 6:1-549.

ELVIN, D. W. 1963. Variation and distribution of the shovel-nosed snake (*Chionactis occipitalis*) in the Northern Mojave Desert, California and Nevada. Herpetologica 19(1):73-76.

FEDERAL WRITER'S PROJECT. 1950. Idaho, a guide in word and picture. Second ed., revised. New York: Oxford Univ. Press, xiv, 300 pp.

FITCH, H. S. 1940. A biogeographical study of the *ordinoides Artenkreis* of garter snakes (genus *Thamnophis*). Univ. California Publ. Zool. 44(1):1-150.

———. 1941. Geographic variation in garter snakes of the species *Thamnophis sirtalis* in the Pacific coast region of North America. American Midl. Nat. 26(3):570-592.

———. 1948. Further remarks concerning *Thamnophis ordinoides* and its relatives. Copeia 1948(2):121-128.

———. 1956. An ecological study of the collared lizard (*Crotaphytus collaris*). Univ. Kansas Publ., Mus. Nat. Hist. 8(1):213-274.

FITCH, H. S. AND T. P. MASLIN. 1961. Occurrence of the garter snake, *Thamnophis sirtalis*, in the Great Plains and Rocky Mountains. Univ. Kansas Publ., Mus. Nat. Hist. 13(5):289-308.

FITCH, H. S. AND W. W. TANNER. 1951. Remarks concerning the systematics of the collared lizard (*Crotaphytus collaris*), with a description of a new subspecies. Trans., Kansas Acad. Sci. 54(4):548-559.

FOX, W. 1951a. The status of the garter snake, *Thamnophis sirtalis tetrateania*. Copeia 1951(4):257-267.

———. 1951b. Relationships among the garter snakes of the *Thamnophis elegans* Rassenkries. Univ. California Publ. Zool. 50(5):485-530.

GANNETT, H. 1900. A gazeteer of Utah. Bull., United States Geol. Surv., 166, 43 pp., 1 map.

———. 1906. A dictionary of altitudes in the United States. 4th ed., Bull., United States Geol. Surv., 274:1072.

GLOYD, H. K. 1940. The rattlesnakes, genera *Sistrurus* and *Crotalus*. A study of zoogeography and evolution. Chicago Acad. Sci., Spec. Publ., 4:vii 266.

GROBMAN, A. B. 1941. A contribution to the knowledge of variation in *Opheodrys vernalis* (Harlan), with the description of a new subspecies. Misc. Publ. Mus. Zool., Univ. Michigan 50:1-38.

HALL, E. R. 1929. A "den" of rattlesnakes in eastern Nevada. Bull. Antiven. Inst. America 3(3):79-80.

———. 1946. Mammals of Nevada. Berkeley and Los Angeles: Univ. Californie Press, xi, 710 pp.

HARDY, R. 1948. The greater western skink in Nevada and Utah. Herpetologica 4(5):165.

HEYREND, F. AND A. CALL. 1951. Growth and age in western striped racer and Great Basin rattlesnakes. *In* Symposium: A snake den in Tooele County, Utah. Herpetologica 7:28-40.

HUBBS, C. L. AND R. R. MILLER. 1948. The Great Basin with emphasis on glacial and post-glacial times. II. The zoological evidence. Bull. Univ. Utah 38(2), Biol. Ser. 10(7):18-166.

KLAUBER, L. M. 1928. The *Trimorphodon* (lyre snake) of California with notes on the species of the adjacent area. Trans., San Diego Soc. Nat. Hist. 5(11):183-194.

———. 1930. New and renamed subspecies of *Crotalus confluentus* Say, with remarks on related species. Trans., San Diego Soc. Nat. Hist. 6(3):95-144.

———. 1931. A new species of *Xantusia* from Arizona, with a synopsis of the genus. Trans. San Diego Soc. Nat. Hist. 7(1):1-16.

———. 1935. *Phyllorhynchus*, the leaf-nosed snake. Bull. Zool. Soc. San Diego (12):1-31.

———. 1936. The California king snake, a case of pattern dimorphism. Herpetologica 1(1):18-27.

———. 1939. Studies of reptile life in the arid southwest. Part III. Notes on some lizards of the southwestern United States. Bull., Zool. Soc. San Diego 14:80-100.

———. 1940a. The lyre snakes (genus *Trimorphodon*) of the U. S. Trans. San Diego Soc. Nat. Hist. 9(19):163-194.

———. 1940b. Two new subspecies of *Phyllorhynchus*, the leaf-nosed snake, with notes on the genus. Trans. San Diego Soc. Nat. Hist. 9(20):195-214.

———. 1941. The long-nosed snakes of the genus *Rhinocheilus*. Trans. San Diego Soc. Nat. Hist. 9(29):289-332.

———. 1943. The subspecies of the rubber snake, *Charina*. Trans., San Diego Soc. Nat. Hist., 10(7):83-90.
———. 1945. The geckos of the genus *Coleonyx* with descriptions of new subspecies. Trans., San Diego Soc. Nat. Hist., 10(11):133-216.
———. 1946. The glossy snake, *Arizona*, with descriptions of new subspecies. Trans., San Dietgo Soc. Nat. Hist., 10(17):311-398, pls. 7-8.
———. 1947. Classification and ranges of the gopher snakes of the genus *Pituophis* in the western United States. Bull., Zool. Soc. San Diego, 22:1-81.
———. 1956. Rattlesnakes. Their habits, life histories, and influence on mankind. Berkeley and Los Angeles: Univ. California Press, 2 vols.:xxix 7080, xvi, 709-1476.
Linsdale, J. M. 1938. Environmental responses to vertebrates in the Great Basin. American Midl. Nat. 19(1):1-206.
———. 1940. Amphibians and reptiles in Nevada. Proc., American Acad. Arts and Sci. 73(8):197-257.
Lombard, J. 1949. Notes on the desert whiptail lizard in Utah. Copeia, 1949 (3):234.
Norris, K. S. 1953. The ecology of the desert iguana *Dipsosaurus dorsalis*. Ecology, 34:265-287.
———. 1958. The evolution and systematics of the iguanid genus *Uma* and its relation to the evolution of other North American desert reptiles. Bull., American Mus. Nat. Hist., 114(3):251-326.
Ortenburger, A. I. 1928. The whip snakes and racers. Genera *Masticophis* and *Coluber*. Memoir. Univ. Michigan Mus.:I xviii 247.
Pack, H. J. 1930. Snakes of Utah (compiled by G. F. Knowlton). Utah Agri. Exper. Sta., Utah State Agri. Coll. Bull. 221:1-32.
Parker, D. D. 1951. A taxonomic and distributional study of the subspecies of the iguanid lizard, *Uta stansburiana* in the eastern Great Basin, 1950-51. Master of Sci. thesis, Dept. Zool. & Entomol., Brigham Young Univ., vi 50 pp. (unpublished).
Phelan, R. L. and B. H. Brattstrom. 1955. Geographic variation in *Sceloporus magister*. Herpetologica 11(1):1-14, 1-3.
Reeve, W. L. 1952. Taxonomy and distribution of the horned lizards genus *Phrynosoma*. Univ. Kansas, Sci. Bull. 34(14):817-960.
Robison, W. G., Jr. and W. W. Tanner. 1962. A comparative study of the species of the genus *Crotaphytus* Holbrook (Iguanidae). Brigham Young Univ., Sci. Bull., Biol. Ser. 2(1):1-31.
Rodgers, T. L. and H. S. Fitch. 1947. Variation in the skinks (Reptilia: Lacertilia) of the *skiltonianus* group. Univ. California Publ. Zool. 48(4): 169-200.
Ruthven, A. G. 1908. Variations and genetic relationships of the garter snakes. United States Nat. Mus. Bull. 61:1-201.
———. 1926. Notes on Utah reptiles. Occas. Papers, Mus. Zool. Univ. Michigan. 179:1-4.
———. 1932. Notes on the amphibians and reptiles of Utah. Occas. Papers, Mus. Zool. Univ. Michigan 243:1-4.
Savage, J. M. 1952. Studies on the lizard family *Xantusiidae*. I. The systematic status of the Baja California night lizards allied to *Xantusia vigilis*, with the description of a new subspecies. American Midl. Nat. 48(2):467-479.
Schmidt, K. P. 1921. A new name for a subspecies of *Uta stansburiana*. Baird & Girard. American Mus. Novitates 15:1-2.
———. 1953. A check list of North American amphibians and reptiles. 6th edition. Chicago: Univ. Chicago Press, for American Soc. of Ichthyologists & Herpetologists, viii 280 pp.
Shannon, F. A. 1950. Some additional remarks on the status of the species *Sceloporus occidentalis*. *Herpetologica* 6(2):31-32.
Smith, H. M. 1939. The Mexican and Central American lizards of the genus *Sceloporus*. Zool. Series, Field Mus. Nat. Hist. 26(445):1-397.
———. 1946. Handbook of Lizards. Lizards of the United States and of Canada. Ithaca. N. Y.: Comstock Publishing Co., Inc., xxi 557 pp.

STEBBINS, R. C. 1954. Amphibians and reptiles of Western North America. New York: McGraw-Hill Book Company, Inc., xxii 528 pp.

STEJNEGER, L. H. 1919. The names of the horned toad from Salt Lake Basin. Copeia (65):3-4.

STICKEL, W. H. 1938. The snakes of the genus *Sonora* in the United States and Lower California. Copeia 1938(4):182-190.

———. 1943. The Mexican snakes of the genera *Sonora* and *Chionactis* with notes on the status of other colubrid genera. Proc. Biol. Soc. Washington 56:109-127.

STUART, L. C. 1932. The lizards of the Middle Pahvant Valley, Utah; materials for a study in saurian distribution. Occas. Papers, Mus. Zool. Univ. Michigan 244:1-33

STULL, *O. G.* 1940. Variations and relationships in the snakes of the genus *Pituophis*. United States Nat. Mus. Bull. 175:1-225.

TANNER, V. M. 1927. Distributional list of the amphibians and reptiles of Utah. Copeia (163):54-58.

———. 1928. Distributional list of the amphibians and reptiles, No. 2 Copeia (166):24-27.

———. 1929. Distributional list of the amphibians and reptiles of Utah, No. 3. Copeia (171):6.

———. 1933. A study of the variation of the dorsal scale rows of *Charina bottae* (Blainville). Copeia 1933(2):81-84.

TANNER, V. M. AND W. W. TANNER. 1939. Notes on *Charina bottae* in Utah: reproduction. Great Basin Nat. 1(1):27-30.

TANNER, W. W. 1939. Reptiles of Utah County. Proc. Utah Acad. Sci., Arts and Letters 16:107.

———. 1939. The status of the Utah gopher snake. Proc. Utah Acad. Sci., Arts and Letters 26:107.

———. 1940. Notes on the herpetological specimens added to the Brigham Young University Vertebrate Collections during 1939. Great Basin Nat. 1:138-146.

———. 1941. A study of the variation in the less common snakes of Utah. Great Basin Nat. 2(1):16-28.

———. 1943. Notes on the life history of *Eumeces skiltonianus skiltonianus*. Great Basin Nat. 4(2):81-88.

———. 1946. A taxonomic study of the genus *Hypsiglena*. Great Basin Nat. 5(3-4):25-92.

———. 1950. Variation in the scale and color pattern of the wandering garter snake in Utah and southern Idaho. Herpetologica 6(7):194-196.

———. 1956. A new *Sceloporus magister* from eastern Utah. Great Basin Nat. 15(1):32-34.

———. 1957. A taxonomic and ecological study of the western skink *Eumeces skiltonianus*. Great Basin Nat. 17(3-4):59-94.

———. 1966. A re-evaluation of the genus *Tantilla* in the southwestern United States and northwestern Mexico. Herpetologica 22(2):134-150.

———. 1966. The night snakes of Baja California. San Diego Soc. Nat. Hist. 14(15):189-196.

TANNER, W. W. AND B. H. BANTA. 1963. Distribution of *Tantilla utahensis* Banchard. Great Basin Nat. 22(4):116-118.

TANNER, W. W. AND R. B. LOOMIS. 1957. A taxonomic and distributional study of the western subspecies of the milk snake, *Lampropeltis doliata*. Trans., Kansas Acad. Sci. 60(1):12-42.

TANNER, W. W. AND CLIVE D. JORGENSEN. Reptiles of the Nevada Test Site. Brigham Young Univ. Sci. Bull. 3(2):1-35.

TAYLOR, E. H. 1935. A taxonomic study of the cosmopolitan scincoid lizards of the genus *Eumeces* with an account of the distribution and relationships of its species. Univ. Kansas Sci. Bull. 23:1-643.

TURNER, F. B. 1959. *Xantusia v. vigilis* in Death Valley National Monument. Copeia 1959(2):172-173.

United States Geological Survey. 1953. Map, United States, Water resources and development. Government Printing Office, Washington, D.C.
Van Denburgh, J. 1897. The reptiles of the Pacific Coast and Great Basin. An account of the species known to inhabit California, and Oregon, Washington, Idaho and Nevada. Occas. Papers, California Acad. Sci. 5:1-236.
———. 1905. The reptiles and amphibians of the islands of the Pacific Coast of North America from the Farallons to Cape San Lucas and the Revilla Gigedos. Proc., California Acad. Sci. ser. 3, 4(1):1-40.
———. 1920a. A further study of variation in the gopher snakes of western North America. Proc. California Acad. Sci. ser. 4, 10(1):1-28.
———. 1920b. Description of a new subspecies of boa (*Charina bottae utahensis*) from Utah. Proc. California Acad. Sci. ser. 4, 10(3):31-32.
———. 1922. The reptiles of western North America. Vol. I. Lizards. Vol. II. Snakes and Turtles. Occas. Papers, California Acad. Sci. 10:1-611, 617-1028.
Van Denburgh, J. and J. R. Slevin. 1915. A List of the amphibians and reptiles of Utah, with notes on the species in the collection of the Academy. Proc., California Acad. Sci. ser. 4, 5(4):99-110.
———. 1918. The garter snakes of western North America. Proc. California Acad. Sci. ser. 4, 9(6):197-220.
———. 1921. A list of the amphibians and reptiles of Idaho, with notes on the species in the collection of the Academy. Proc. California Acad. Sci. ser. 4, 11(3):38-47.
Wells, Philip V. and Clive D. Jorgensen. Pleistocene Wood Rat Middens and Climatic Change in Mohave Desert: A record of juniper woodlands. Sci. 143(3611):1171-1174.
Woodbury, A. M. 1931. A descriptive catalog of the reptiles of Utah. Bull. Univ. Utah 21(5): x 129.
———. 1952. Gazetteer of Utah localities and altitudes. Cooperative Project, Zool. Dept., Univ. Utah, & Utah State Inst. Fine Arts, W. P. A., 215 pp. (mimeographed).
Woodbury, A. M. and R. M. Hansen. 1950. A snake den in Tintic Mountains, Utah. Herpetologica 6:66-70.
Woodbury, A. M. and E. W. Smart. 1950. Unusual snake records from Utah and Nevada. Herpetologica 6(2):45-47.

THREE NOTEWORTHY COLUBRIDS FROM SOUTHERN SONORA, MEXICO

Max A. Nickerson and H. L. Heringhi[1]

Two separate collections of amphibians and reptiles were made by private collectors during the summers of 1964 and 1966 in and around Alamos, Sonora, Mexico. These collections are deposited in the herpetological collection of Arizona State University (ASU). This report concerns three rare species of colubrids from these collections.

Dryadophis cliftoni Hardy

This snake was originally described as *Dryadophis fasciatus* Hardy, 1963 (Copeia, 669-672). This name was found to be preoccupied and was replaced by *Dryadophis cliftoni* Hardy, 1964 (Copeia, 714). A single, adult female (ASU 5848) was taken near the Anna Maria Mine, approximately 20 miles east of Alamos, near the Sonora-Chihuahua border, between August 1-15, 1964. This is the fifth specimen reported and the first from Sonora. It represents an extension of the range about 325 miles NNW from Plumosas, Sinaloa, Mexico.

This specimen differs from those described by Hardy (1963) as follows: infralabials 10-11, most previously 10-10; the dorsal surface of the head is tan from the parietals anterior, whereas in others only the top of the head anterior to eyes was tan; and 32 dark dorsal blotches (which become lighter anteriorly), less than the 40-46 recorded.

Sonora aemula Cope

All five specimens were collected within the city limits of Alamos except ASU 6458, which was taken a short distance south of Alamos. Two males (ASU 5850, 5851) were collected in July, 1964, and two females (ASU 6611, 6612) and one male (ASU 6458) in July, 1966. They ranged in size from a total length of 242 mm. and 35 mm. tail length (ASU 6612) to 365 mm. total length and 58 mm. tail length (ASU 5850). This brings the known number of specimens to ten.

None of the five snakes showed the same dorsal or ventral pattern. Zweifel and Norris (1955) state that body color pattern is variable and shows little consistency in the arrangement of the red, black, and white rings. (Fig. 1 shows the diversity encountered.) Such a polychromatic condition is difficult to interpret. Zweifel and Norris (*op. cit.*) state that in the specimens they studied each red scale (dorsal assumed) was centered with black. In the ASU specimens some of the dorsal scales approaching the venter lose the black pigmentation, also the black is not always centered on the scale.

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Scutellation and Size in Three Species of Sonoran Colubrids

	Dorsals	Ventrals	Caudals	Supralabials	Infralabials	Preoculars	Postoculars	Loreals	Temporals	Total Length	Tail Length
ASU 5848 D. cliftoni f.	17-17-15	192	146	8/8	10/11	1/1	2/2	1/1	2-2-3/ 3-2-2	1395mm	470mm
ASU 5850 S. aemula m.	15-15-15	146	40	7/7	8/8	1/1	2/2	1/1	1-2/1-2	365mm	58mm
ASU 5851 m.	15-15-15	149	41	7/7	7/7	1/1	2/2	1/1	1-2/1-2-2[1]	308mm	53mm
ASU 6458 m.	16-15-15	144	21*	7/7	8/8	1/1	2/2	0/0	1-2/1-2	282mm*	28mm*
ASU 6611 f.	16-15-15	162	35	7/7	7/7	1/1	2/2	1/1	1-2/1-2	323mm	44mm
ASU 6612 f.	16-15-15	160	38	7/7	8/7	1/1	2/2	1/1	1-2/1-2[1]	242mm	35mm
ASU 5849 S. lippiens m.	19-19-19	214	20	6/6	7/7	1/1	1/1	0/0	1-3-3/ 1-2-3	380mm	26mm
ASU 6634 m.	19-19-19	213	22	5/5	7/6	1/1	1/1	0/0	1-3-3/ 1-3-3	388mm	33mm

* Part of tail missing.

1 These specimens tend toward a third row of temporals on the left.

One specimen (ASU 6612) is devoid of any bands or rings on the dorsum of the body and has lost the black band which borders the posterior margin of the white nuchal band (characteristic of all of the other specimens). One specimen (ASU 6611) is devoid of bands or rings for the first third of its length. Zweifel and Norris (*op.cit.*) report one female (MVZ 50746) and Bogert and Oliver (1945), one male (AMNH 63738) as having lost the banded pattern anteriorly. The dorsal pattern of this series, except ASU 6612, consists of a series of triads either white-black-white or black-white-black on a red ground color. Apparently on three specimens (ASU 5850, 6458, 6611) the black spots (usually centered on each scale) have fused to form black bands on both sides of what would be a white-black-white triad converting this to a five-banded sequence black-white-black-white-black. The other alternative being that two triads may have fused, losing one band in the process. The number of the five-banded sequences varied from zero to three.

The triads of an individual may all be black-white-black at ASU 5851, or white-black-white (except those fused) as ASU 6458, or change from one to the other as ASU 5850. The number of body triads (counting the aberrant bandings as one) varies from zero to ten. Zweifel and Norris (*op. cit.*) mention red rings on two specimens; however, only ASU 5850 had red crossing the venter to form rings. In this specimen all bands—black, white, and red (except anteriorly)—cross the venter to form rings. In the remaining specimens in the Arizona State University collection the venter is white with only the black crossing it to form rings. However, on the tail the red extends down to produce a red ventral surface with black and white rings. One specimen (ASU 6612) has an immaculate venter except for a black and white ring at the tip of the tail.

Sympholis lippiens rectilimbus Hensley

An adult male (ASU 5849) was taken on the road between Los Trincheros and Alamos (14 mi. W. of Alamos on the Alamos-Navojoa road) between June 27 and July 10, 1964 (10:00 p.m.-1:30 a.m.). Another adult male (ASU 6634) was taken 10 mi. W. of Alamos August 6, 1966, 11:00 p.m.

According to Hensley (1966), this subspecies differs from *S. l. lippiens* principally in shape and position of nuchal band, ventral pattern details, and head scutellation. He describes *S. l. rectilimbus* as having a straight margin on the anterior border of the white nuchal collar, a dark blotch or wide line in each interspace on the venter (at midline), narrower interspaces between the body bands than *S. l. lippiens*, only the third supralabial entering the orbit, and loreals often reduced or absent. Both specimens (ASU 5849, 6634) agree with the last three characteristics but not with the first two. The anterior border of the white nuchal band of ASU 5849 projects caudad forming a V. On ASU 6634 it makes a looplike extension cephalad similar to *S. l. lippiens*, although not as pronounced as Hensley (*op. cit.*, Fig. 2B, p. 51) illustrates.

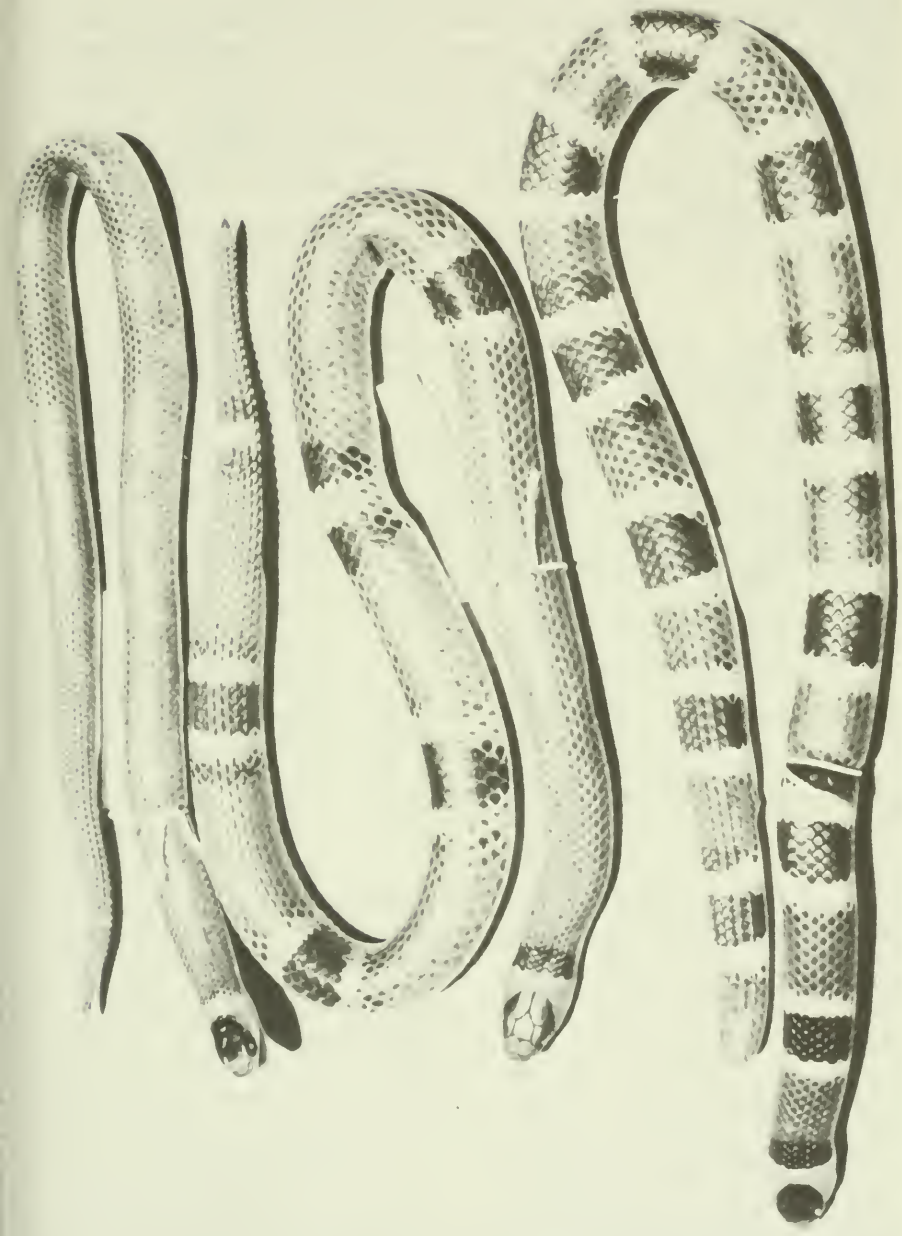

Figure 1. Variability in dorsal pattern of *Sonora aemula*. Top to bottom ASU 6612, 6611, 6458.

Furthermore, the ventral pattern of both snakes has a closer resemblance to *S. l. lippiens* than *S. l. rectilimbus* (Hensley, *op. cit.*, Fig. 2 G&H, p. 51). The interspaces on ASU 5849 are nearly immaculate, whereas on ASU 6634 some interspaces are diffusely pigmented. More specimens should be examined to evaluate these characters and the validity of this subspecies.

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Literature Cited

Bogert, Charles M., and James A. Oliver. 1945. A preliminary analysis of the herpetofauna of Sonora. Bull. Amer. Mus. Nat. Hist., 83:301-425; plates 37.

Hardy, Laurence M. 1963. Description of a new species of snake (Genus *Dryadophis*) from Mexico. Copeia, 1963(4):669-672.

———. 1964. A replacement name for *Dryadophis fasciatus* Hardy. Copeia, 1964(4):714.

Hensley, M. Max. 1966. A new subspecies of the Mexican snake, *Sympholis lippiens* Cope. Herp., 22(1):48-55; 2 figs.

Zweifel, Richard G., and Kenneth S. Norris. 1955. Contribution to the herpetology of Sonora, Mexico. Amer. Mid. Nat., 54(1):230-249.

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